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the OIL AND GAS JOURNAL

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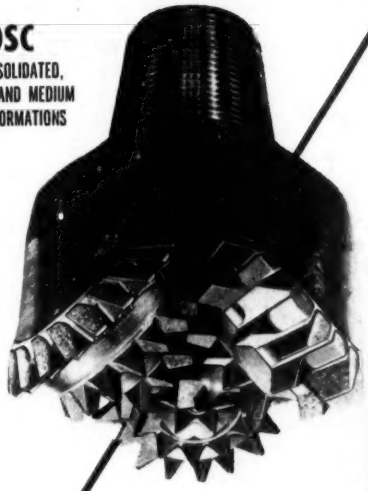

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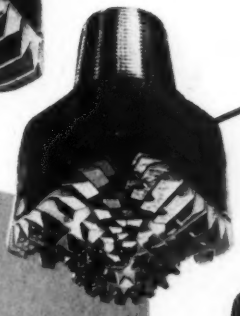

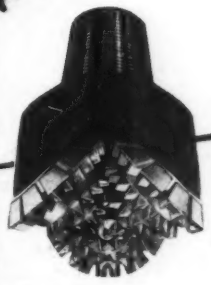

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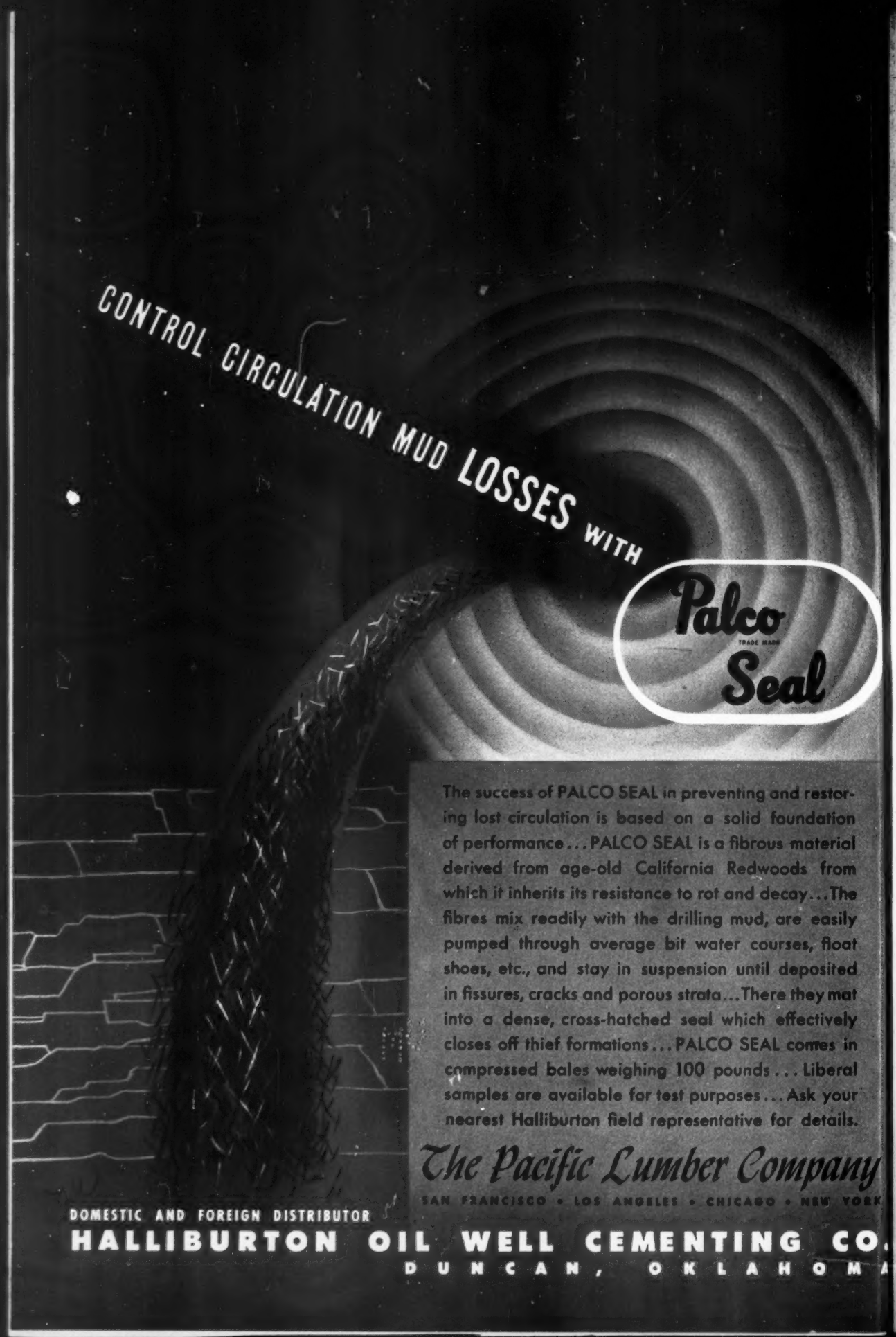
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THE OIL AND GAS JOURNAL

The Coming Congress

BUSINESS, generally, is highly optimistic over the results expected from the Eightieth Congress which begins its work this week. The oil industry shares in that optimism.

There is no doubt that the coming Congress will eliminate many government controls, reduce interference in business decisions, cut spending, check union-labor excesses, and provide more opportunity for private enterprise and the free play of economic forces.

But the millennium for private capitalism is not in the offing.

The political position of the newly elected senators and representatives is far to the right of their New Deal predecessors. Many observers say it is not as far to the right as the disposition of the voters. But the temper of the electorate can and does change rapidly, and the Washington administration is usually not too far behind shifts in public sentiment.

The pendulum which has swung to the right soon begins to swing back toward the left, but always there is a forward movement and it never gets back to the same spot. Witness the permanence and general acceptance of the political-social movements which at one time were considered radical and revolutionary—public schools, free highways, abolition of slavery, women's suffrage, direct election of senators, federal income taxes, the 8-hour day, railroad regulation, antitrust laws, and collective bargaining.

It is also significant that most of our political reforms were accomplished in periods of economic depression and social unrest. When the majority of the people are reasonably prosperous there is little urge to change the status quo.

The lesson of history is inexorable. The next couple of years will see a trimming down of the fringes and accessories of the New Deal edifice but a longer period will be required to change its basic structure. The relationships between Government and industry will be smoother, the mechanics of regulation less irritating and unpredictable, but the concept of public policy expressed through federal regulation will continue to influence business operations. We still have an economy of part free enterprise, part government control, though emphasis is now on the former.

What the long-range trend will be depends on how the average man thinks industry is performing. If he comes to feel that he is not getting a fair break in matters affecting his standard of living, and that industry is making excessive profits, crowding out small competitors, wastefully exploiting natural resources, usurping political power, or operating contrary to the public good, the present conservative, industry-minded complexion of Congress will not last long.

The responsibilities of industry in its now more offensive position are even greater than they were in the defensive period of the immediate past. Of no enterprise is this more true than the oil business.

Panhandle Eastern Attacks Order Approving Michigan Gas Line

WASHINGTON.—A demand that the Federal Power Commission withdraw or reopen for reconsideration and further hearings its order of November 30 approving construction of a new gas pipe line to Detroit by Michigan-Wisconsin Pipe Line Co. has been filed by Panhandle Eastern Pipe Line Co.

Michigan-Wisconsin is a new affiliate of Michigan Consolidated Gas Co. which now obtains gas from Panhandle. Panhandle unsuccessfully fought its application for a certificate for the new line, which is also designed to deliver gas to various cities in Wisconsin and other states, on the ground that Panhandle has exclusive right to serve the Detroit area under the "grandfather clause" of the Natural Gas Act. The case likely will be carried to the courts for a final determination of the right of an interstate pipe line to exclusive market in its service area.

In its petition to set aside the order, Panhandle makes detailed allegations that the order is void and illegal. It claims the order was not an actual certificate for construction but only a notice of intention to issue a certificate, and that the commission's failure to issue an opinion in connection with the order makes it impossible to determine the evidence and reasoning used by FPC.

Since the order was issued, Panhandle states, two things have occurred to make it impossible for Michigan-Wisconsin to obtain gas it relied on. One is the December 9 order of the Oklahoma Corporation Commission in the Peerless Oil & Gas Co. case setting a minimum price of 7 cents per 1,000 cu. ft. for gas from Hugoton field. The other is the action, alleged as a fact by Panhandle, of Magnolia Petroleum Co., Skelly Oil Co., Stanolind Oil & Gas Co., and United Producing Co. in cancelling their contracts to supply gas to Phillips Petroleum Co., which gas was to have been the major supply of Michigan-Wisconsin. Panhandle claims Phillips is not legally obligated to supply gas to the new line and will be physically unable to do so.

Panhandle charges Michigan-Wisconsin is not able to perform the service proposed and is not eligible to receive a certificate because it has not firm commitments for gas supply, has not obtained authorization to do business in any state except Michigan, has not obtained sales contracts and permission to construct lines to many cities in Wisconsin and Iowa where markets are necessary to make the operation a success, has not submitted assurance of adequate financing nor approval of the Securities and Exchange Commission, has not submitted proper rate schedules, and has not obtained approval for necessary connections with the Austin gas field in Michigan.

It is also charged that FPC acted in undue haste in deciding the case before a December 1 deadline set by Michigan-Wisconsin, thereby providing inadequate time for submission and consideration of evidence and preparation of briefs and arguments, and that FPC failed to admit and consider pertinent evidence that Panhandle is ready and able to supply the service offered by Michigan-Wisconsin.

Oil Companies Sued in Labor Drive For Retroactive Portal Pay

PORTAL-TO-PORTAL pay suits were injected into the labor-management picture of the petroleum industry this week following the filing of several actions against oil companies. Petroleum-industry officials were watching developments in industry generally where a total of $1,256,000,000 has been asked in back pay and damages up to early this week.

Biggest suit reported against an oil company is a $22,000,000 action brought against Standard Oil Co. (Ohio). In Houston a local of the Oil Workers International Union filed a $3,500,000 suit against Pan American Refining Corp., claiming back overtime pay for 1,081 employes since October 1938. Another suit for $325,000 was filed against Crown Central Petroleum Co. for 105 refinery employes since 1938.

Houston union officials said more suits, totaling more than $6,500,000 will be filed soon against three Sinclair companies. They are Sinclair Refining Co., Sinclair Pipe Line Co., and Sinclair Rubber, Inc.

In Fort Worth, O. A. Knight, president of C.I.O. Oil Workers Union, said the national organization was "not yet prepared to say what the attitude or action of the international headquarters will be with regard to the suits." All suits, he said, "are entirely up to the local unions," but added that headquarters is advising the locals "what their rights are under the law, and the procedure by which these rights might be protected."

The suits are the outgrowth of a Supreme Court decision that employes are entitled to compensation for time spent while changing shifts on company property. Under the court decision, this time was ruled a part of the normal work week.

The National Petroleum Association's Washington office, in a message to its member companies, said a serious problem is facing the oil industry in the current wave of suits being filed as a result of the decision. The association's Washington staff said it had been working with a committee of trade-association attorneys drafting legislation designed to reduce liability, and solicited suggestions as to steps which might be followed.

"There are two different ways of approaching this relief, which might be called the short-range view and the long-range view," the NPA statement said. "The sponsors of the long-range view maintain that the Fair Labor Standards Act has been entirely distorted out of its original purpose by the interpretations of the wage and hour administrator and by the courts, and that the only legislation of any value would be a substantive change in the act. There is no doubt that basic changes are needed in the act, but representatives of industry generally here in Washington are uniting behind a program designed to secure immediate relief from the portal-to-portal pay suits with the idea of pressing for more fundamental changes in the act later."

Oil Exports to Russia Exceed $2,000,000

WASHINGTON.—Exports of petroleum and petroleum products to the U.S.S.R. during the first 6 months of 1946 were valued at $2,215,000 in a report issued last week by the Department of Commerce. Total exports to Russia, including reexports, were figured at $223,439,000.

Heading the list of petroleum products were gas oil and distillate fuel oil, listed at $1,005,000, followed by motor fuel and gasoline, $571,000. Well and refining machinery exported totaled $1,490,000, and pumping equipment was listed at $2,023,000.

WAA Sets February 10 Date to Open New Bids for Big-Inch Lines

WASHINGTON.—New bids for purchase of the Government's Big-Inch and Little Big-Inch pipe-line systems will be opened by the War Assets Administration at 11 a.m., February 10, in accordance with the new disposal policy of Administrator Robert M. Littlejohn.

All bids, which must be filed by noon of February 8, must be submitted on forms available on request from War Assets Administration, which set forth all the conditions of the sale, thus making all bids comparable. The lines are to be sold, rather than leased, and may be used for the movement of petroleum, petroleum products, or natural gas, or a combination of them, without restriction.

As he promised the House investigating committee, Littlejohn has abandoned the pipe-line disposal policy of his predecessor and has prepared a new report which is scheduled to go before Congress at the opening of its session January 3. Under the Surplus Property Act such a report must lie before Congress for 30 days before action is taken under it. It is unlikely that Congress will disapprove the report, and apparently Littlejohn is so confident of this that he is preparing to receive and open bids only a few days after expiration of the statutory waiting time.

Setting of the date for opening the second group of bids for the war-built pipe lines marks another episode in the Government's efforts to dispose of the system. The policy adopted by the old Surplus Property Administration and at first followed by WAA as SPA's predecessor, favored sale or lease of the lines for use to move oil.

Sixteen bids for the lines were opened last July 31. They proposed a wide variety of operating plans, terms, and methods of financing. On November 16, Littlejohn announced before the House surplus-property investigating committee that he was rejecting all the offers on grounds none guaranteed "fair price" to the Government. He fixed that price as at least $113,700,000.

During the recent strike by soft coal miners, the WAA leased the lines on a temporary basis to Tennessee Gas & Transmission Co. for movement of gas to northeastern states during the fuel shortage. T. G. & T. was not a bidder for the lines. (For information on present use of the Big-Inch system, see the Pipe-Line News Section, page 89.)

Series on Modern Rotary Drilling Starts in This Issue

STARTING in this issue (page 75), The Oil and Gas Journal presents a series of discussions on "Modern Rotary Drilling" designed to give the reader from week to week concise but complete descriptions of the various developments in rotary drilling. The series will be of interest to all those who have responsibilities in the drilling of more than 20,000 rotary wells yearly in the United States and other countries.

Zaba Is Author

In the presentation of the material emphasis has been placed on discussions which will be of practical value to drilling contractors, heads of drilling departments, engineers, tool pushers, drillers, and others who seek a working knowledge of the latest developments in rotary-drilling techniques.

The series will be authored by J. Zaba, widely known petroleum engineer now engaged in consulting work with offices in Houston. He has been actively connected with drilling and production operations since 1925.

J. ZABA

Zaba was born in Poland and before leaving that country spent 2½ years at the Vienna, Austria, Institute of Technology, 1 year at the University of Krakow, and 3 years at the Academy of Mines from which he received the degree of mining engineer in 1923. He came to the United States in 1924 and after 1 year's work received the degree of master of science from the University of Pittsburgh.

Was Rig Helper

Following graduation, Zaba went to work as a rig helper in a Louisiana field. Later he secured experience as a roustabout and in other field work. He became associated with Rio Bravo Oil Co. and for several years was in charge of engineering in the drilling and producing operations of that company. More recently he was in charge of the drilling and producing activities of the D. D. Feldman interests.

Zaba is an active member of the American Institute of Mining and Metallurgical Engineers, American Association of Petroleum Geologists, American Petroleum Institute, Houston Geological Society, and Houston Engineers Club.

Texas Plant Asks More Crude to Avert Shutdown

AUSTIN, Tex.—A request for additional crude oil to forestall a threatened shutdown of its refinery at Texas City has been made to the Texas Railroad Commission by American Liberty Oil Co., Dallas.

D. R. Zachry, vice president, said restricted production allowables in Texas have made plant operation difficult and declared that for several months it has been processing crude at about two-thirds of capacity.

Zachry said his firm appealed for increased allowables at the commission hearing December 19, and that following the commission's action in decreasing the allowable considerably, it was notified by crude suppliers that allotments to the refinery would be decreased.

The day before the petition was filed with the commission, Zachry said in Galveston the plant would shut down unless the crude shortage was alleviated.

American Liberty operates an 18,500-bbl. daily capacity refinery at Texas City; its Talco Asphalt and Refining Division operates a 12,000-bbl. daily capacity plant at Mount Pleasant. The Railroad Commission was expected to take action soon on the company's request for more crude.

Oil Industry Output at All-Time High in 1946, Pew Says

IN a year-end review of the achievements of the petroleum industry, J. Howard Pew, president of Sun Oil Co., said 1946 witnessed the production of a volume of crude oil and products greater than any war year and more than 24 per cent above the highest prewar peak.

Pew attributed the industry's 1946 record to the absence of any serious labor difficulty in the industry and to the large, privately financed investment in plants and other equipment during the war with the continuing development of management "know-how."

The Sun Oil president viewed the industry as entering the new year in a sound condition. "Barring serious work stoppages in 1947, every indication points to an expectation that the oil industry in the coming year will substantially exceed the record of 1946," he said.

In reviewing the industry's accomplishments, Pew said:

"The industry's products, highest in quality it has ever achieved, have been abundantly available for all at costs which are at the bottom of the commodity-price index. A gasoline dollar, excluding tax, in 1946 bought 48 per cent more than the food dollar, 50 per cent more than the clothing dollar, and 30 per cent more than a dollar spent for all consumer items. At the same time, the industry's wages to employes were among the highest paid by any industry.

"Production of crude oil and principal petroleum products averaged approximately 5,075,000 bbl. daily in 1946, compared with a peak wartime production, in 1944, of 4,864,300 bbl. daily and a prewar peak production, in 1941, of 4,072,000 bbl. daily.

"The industry's production of gas oil and distillate fuels, the components containing home-heating oils, was more than 50 per cent above the highest prewar year. Production of kerosene was up more than 45 per cent; residual fuel oil, 28 per cent; lubricating oils nearly 13 per cent, and other products 42 per cent.

"Motor fuel production was 4 per cent higher than the peak war year, and 9.4 per cent above the peak prewar year."

Texas Board Orders Multiple-Car Rate

AUSTIN, Tex.—Texas Railroad Commission has ordered lower railroad-transportation rates for multiple-car shipments of gasoline and naphtha from two Texas points to specified destinations in what is considered to be the first fixing of a trainload rate in the history of the petroleum industry.

The order was issued on application of Texas & Pacific Railway, following announcement by Cosden Petroleum Corp. of a preliminary survey for construction of a 225-mile, 4-in. gasoline pipe line from its Big Spring refinery to Weatherford.

The new rates apply on shipments from Big Spring and Colorado City. They are: From Big Spring to Sweetwater, 3½ cents per cwt.; to Abilene, 5½ cents; to Cisco, 6½ cents; to Orme, 11 cents. From Colorado City to Range, 6½ cents. The commission order declared the rates were "established to meet pipe-line competition."

It specified that the rates "apply only in lots of not less than 20 cars of 8,000 gal. capacity or more, on one bill of lading on one day, from one consignor to one consignee at one destination, and to be handled at carriers' convenience." Switching charges of connecting lines, if any, will not be absorbed but will be in addition to the line-haul rate.

A.P.I. Marketing Meeting Scheduled for April 1-2

NEW YORK.—The general committee of the American Petroleum Institute's division of marketing has invited officers, executives, and representatives of all petroleum-marketing companies and associations to attend its business meeting and group session April 1-2 in French Lick, Ind.

A.P.I. officials said the invitation is in line with "the policy of institutional revitalization and broadening utility" adopted at the division's meeting in Denver last July. Those planning to attend the French Lick meeting should send requests for room reservations directly to French Lick Springs Hotel, headquarters for the meeting. B. L. Majewski, division chairman, has named P. E. Lakin, Shell Oil Co., Inc., chairman of a committee to arrange the program for the French Lick meeting.

Supervisory Board Sought for Indiana

INDIANAPOLIS, Ind.—Creation of a state commission to supervise production of gas and oil in Indiana will be sought in 1947. John N. Nigh, director of the Indiana conservation commission, said the commission will press the 1947 legislature for passage of a bill authorizing such an organization.

Nigh said the bill probably will provide for a severance tax on production, proper spacing of oil and gas wells, fees and permits for drilling and plugging, and posting of a surety bond to insure proper oil-field practices.

Army, Navy Withdraw From Orient Oil Trade

WASHINGTON.—Beginning this week in the China coast area and after January 31 in the Philippines, private oil companies will have a free hand in supplying petroleum products to the peoples of the western Pacific, the Army and Navy Petroleum Board has announced.

After the end of the war, distribution of limited quantities of oil, kerosene, gasoline, and other products for civilian needs was handled by the Army and Navy. Later the services rented storage space to private concerns and supplied them more than 5,500,000 bbl. of oil and products from military stocks.

Engineers Plan Meeting

J. F. Kyle, of Baldwin Locomotive Works, Pelton Water-Wheel Division, will address a joint meeting of the Oklahoma chapter of the American Society of Mechanical Engineers and the Oklahoma Society of Petroleum Engineers in Tulsa January 22. Kyle's paper is entitled "Hydraulic Pumping Jack."

Index Ready Soon

The complete editorial index of The Oil and Gas Journal for 1946 is now in preparation and will soon be ready. Due to the continued shortage of paper, it will not be published in a regular issue. The complete index, enlarged and improved and with more cross-references, bound separately, will be sent without charge to all subscribers requesting a copy. Address requests to Circulation Department, P.O. Box 1260, Tulsa.

this week

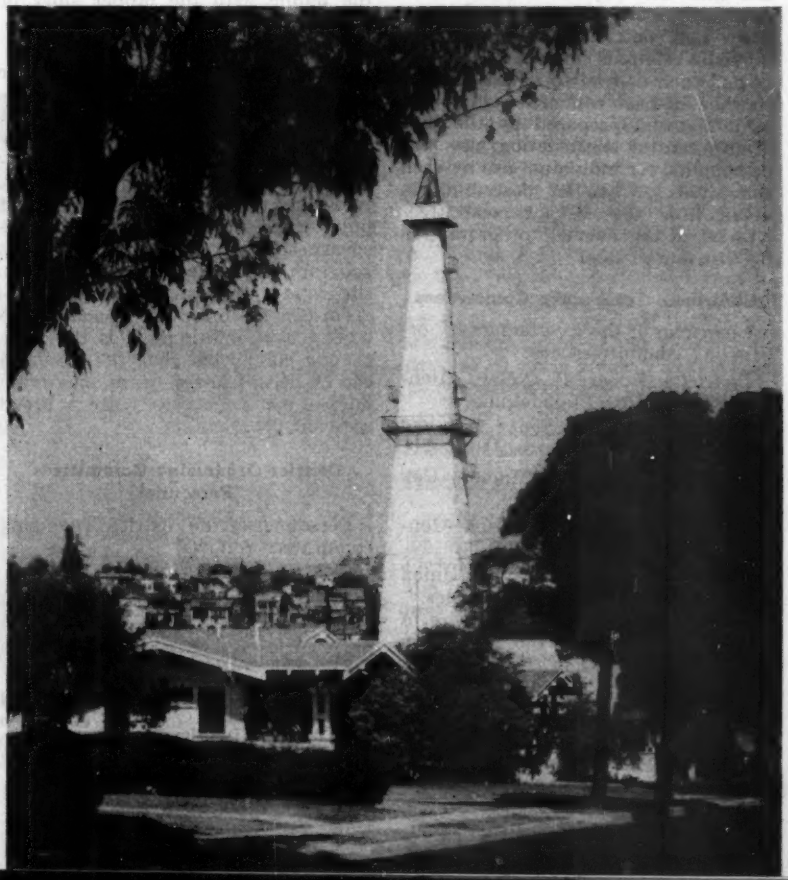
INTERNATIONAL—Standard of New Jersey, Socony-Vacuum confirm preliminary agreement with Anglo-Iranian under which "substantial quantities" of crude oil will be purchased from the prolific Iranian fields. . . . Some 100,000 bbl. daily reported involved in the deal, the second major change in Middle East oil interests disclosed in recent weeks. . . . Jersey and Socony at the same time confirm previously revealed negotiations with Arabian American for the purchase of an interest in the Saudi Arabian concession. . . . ¶Venezuelan Assembly approves permanent surtax on profits carrying a rate reported to be 28 per cent. . . . Reductions up to 4 per cent allowed provided certain capital is reinvested. . . .

PUBLIC RELATIONS—A.P.I. moves ahead with industry's public-relations program. . . . Main public-relations committee names temporary organizing groups which will form nucleus for larger representative committees in each of the five PAW districts. . . . Appointments are a part of the plan to gather initially the full support of all branches of the industry behind the program. . . .

REFINING—American Liberty Oil Co. appeals to Texas Railroad Commission for additional crude to avert shutdown of its Texas City plant. . . . Company officials say refinery's crude supply curtailed following commission action in cutting state's January allowable. . . . ¶Washington officials remove controls on metal containers, giving lubricating-oil suppliers an opportunity to complete for can supplies without priority restrictions. . . . Earle W. Webb, Ethyl Corp. head, warns industry that metallic lead, and hence, Ethyl fluid will continue in short supply, despite removal of government restrictions. . . . ¶Petroleum Heat & Power stockholders approve stock issue for use in the acquisition of Taylor Refining Co. in Texas. . . . ¶Dow Chemical closes deal with WAA for the purchase of styrene and thiokol "N" synthetic-rubber plants in Velasco, Tex. . . .

NATURAL GAS—Panhandle Eastern Pipe Line renews its fight on Michigan-Wisconsin Pipe Line Co.'s project to build new gas line to Detroit area. . . . Asks FPC to reopen for reconsideration its order conditionally approving the project. . . . Ultimate appeal to courts indicated. . . . ¶WAA sets February 10 date for opening second set of bids for purchase of the Big-Inch system. . . . Disposal agency to provide standard forms for proposals of bidders. . . . ¶Texas Railroad Commission approves unique multiple car rate plan advanced by the Texas & Pacific Railway to forestall construction of pipe line contemplated by Cosden Petroleum Corp. . . . ¶Imperial Oil completes 84-mile crude line to Sarnia refinery, using reconditioned pipe originally laid in 1888. . . . ¶Shortage of L.P.G. tank cars grows more acute as U. S. officials take no action on pleas of shippers to delay fertilizer program and assign new-car production to the L.P.G. industry. . . . ¶Austin Field Pipe Line Co., Detroit, files application with FPC for authority to construct lines to two Michigan gas-storage fields. . . . Facilities to be operated by Michigan-Wisconsin Pipe Line. . . .

ACQUISITIONS—Cooperative Refinery Association buys Coralena Oil Co., Tulsa producing company with 189 wells in Oklahoma and Kansas and other undeveloped acreage. . . . Move follows earlier purchase by Cooperative of interest in Bridgeport Oil of Wichita. . . . ¶Pan American Production buys five producing wells in East Texas. . . . ¶Kilgore Petroleum Co. acquires 23 East Texas wells from David E. Coffman estate. . . .



This isn't a monument to oil, but it shows the expensive precautions oil companies must take to muffle noises and confine fire hazards if they drill in zoned residential areas of Los Angeles. This fully enclosed 136-ft. derrick was used by Richfield Oil Corp. in drilling in Boyle Heights, East Los Angeles. The canvas covering was painted aluminum gray, and street frontage of the drill site was landscaped. Late in December the well was abandoned after it was drilled to 5,902 ft., plugged back, and redrilled to 5,650 ft. without encountering showings

District Organizing Groups Named In A.P.I. Public-Relations Program

NEW YORK.—The American Petroleum Institute has taken another major step toward activating its nation-wide public-relations program with the appointment of five district organizing committees.

The district committees are a significant phase of the institute's policy of enlisting support for the program from all segments of the oil industry itself. The districts set up correspond to the former Petroleum Administration for War districts except that Oklahoma and Kansas are included in District III instead of District II.

Announcing the formation of the districts, John M. Lovejoy, president of Seaboard Oil Co. of Delaware, said the temporary organizing groups have been asked to meet within the near future and designate "large representative groups" of oil men in each of the five areas of the country as district public-relations committees.

"Active participation of these district groups in the new oil-industry public-relations program will be discussed with representatives of the public-relations operating committee, who will explain the program in detail and the important part which every oil man and every oil company can contribute," Lovejoy said.

Public-relations counsel will be furnished each district to advise and assist the district committees, Lovejoy said. Material prepared by the program's central organization also will be supplied for individual use by each committee. A booklet describing in detail how the district committees will fit in the over-all program will be distributed later.

Chairmen, Temporary Committees

Chairman of the five temporary organizing committees are:

District I: Robert H. Colley, Atlantic Refining Co., Philadelphia.

District II: L. S. Wescoat, Pure Oil Co., Chicago.

District III: Jake L. Hamon, Cox & Hamon, Dallas.

District IV: W. H. Ferguson, Continental Oil Co., Denver.

District V: Reese H. Taylor, Union Oil Co. of California, Los Angeles.

In his letter notifying members of their appointment to the temporary organizing committees, Lovejoy said:

"We are asking the district organization committees to act as the nucleus for rather large permanent district public-relations committees. The personnel and actual number of members in these district committees will be entirely up to the organization committee, but each committee should be large enough to represent adequately all branches of the oil and gas industry in each district. The permanent district committees should after their organization create appropriate subcommittees; also committees for each state are suggested.

"We feel that the first step in our program is to show the oil industry itself the need for a public-relations program. We are advised that the results of the public-opinion survey recently concluded will be available for distribution to everyone in the industry within the next month or 6 weeks. As you know, the survey indicates that more than one-third of the people in the United States believe the oil industry to be monopolistic in nature and that 57 per cent are willing to believe that prices for our products are not representative of the free competitive market which actually exists. It seems to us that this alone is sufficient reason for the industry to make a serious attempt to correct this misconception. The second step in the program is to reach the public with the proper story of our stewardship of this great industry.

"After you have organized, your permanent committee will be expected among other things to solicit funds for the program on a very wide basis. We feel that broad financial support is essential to wide interest in the program. The district public-relations committee will be the spearhead for the public-relations program in their respective areas, suggesting ways in which the program can be improved or adapted to meet local conditions. It is the hope of our committee that the program can be decentralized to the maximum degree commensurate with a broad national program."

District Organizing Committees' Personnel

Personnel of the district organizing committees follows:

DISTRICT 1

Robert H. Colley, chairman, Atlantic Refining Co.; Fred G. Bannerot, Jr., Elk Refining Co.; John P. Birmingham, Independent Oil Men's Association of New England; W. Chalmers Burns, Richfield Oil Corp. of New York; Wiley Butler, Coastal Oil Co.; Stuart Crocker, Columbia Gas & Electric Co.; John Dressler, New Jersey Gasoline Retailers Association; Gordon Duke, National Council of Independent Petroleum Associations; Walter L. Faust, Socony-Vacuum Oil Co., Inc.; J. B. Fisher, National Petroleum Association; John Harper, Harper Oil Co.; Philip C. Humphrey, The Texas Co.; Wiley Moore, Wofford Oil Co.; Clyde G. Morrill, Atlantic Coast Oil Conference, Inc.; R. M. Parker, Jr., Hartol Products Corp.; D. T. Ring, Pennsylvania Grade Crude Oil Association; Richard Rollins, Atlantic Refining Co.; John R. Suman, Standard Oil Co. (N. J.); William E. White, National Oil Marketers Association.

DISTRICT 2

(Except Oklahoma and Kansas)

L. S. Wescoat, chairman, Pure Oil Co.; H. T. Ashton, Western Petroleum Refiners Association; Merle H. Becker, W. C. McBride & Co.; J. C. Donnell, Ohio Oil Co.; Paul Kempf, Michigan Petroleum Association; B. L. Majewski, Deep Rock Oil Corp.; J. Howard Marshall, National Stripper Well Association; A. M. McKinney, National Supply Co.; Conger Reynolds, Standard Oil Co. (Ind.); J. French Robinson, East Ohio Gas Co.; Charles O. Russell, Liquified Petroleum Gas Association; William A. Stoll, Stoll Oil Refining Co.; Sidney A. Swensrud, Standard Oil Co. (Ohio); H. L. Thatcher, Thatcher Oil Co.; E. V. Weber, Eureka Oil Co.; Russel S. Williams, Individually Branded Petroleum Association.

DISTRICT 3

(Including Oklahoma and Kansas)

Jake L. Hamon, chairman, Cox & Hamon; Hines H. Baker, Humble Oil & Refining Co.; Joseph Bowes, Independent Natural Gas Association; J. H. Dunn, Natural Gasoline Association of America; Hiram M. Dow, Interstate Oil Compact Commission; B. A. Hardey, Independent Petroleum Association of America; C. L. Henderson, Vickers Petroleum Co.; R. C. Jooling, Phillips Petroleum Co.; Clarel B. Mapes, Mid-Continent Oil & Gas Association; T. M. Martin, Lion Oil Co.; C. L. Mayhall, Anderson-Prichard Oil Corp.; N. C. McGewen, United Gas Pipe Line Co.; Fred F. Murray, Oil Well Supply Co.; Bryan W. Payne, East Texas Salt Water Co.; Frank M. Porter, General Mid-Continent Oil & Gas Association; Charles F. Roeser, Roeser & Pendleton, Inc.; G. L. Rowsey, Gulf Coast Refiners Association; Fred W. Shield, Texas Mid-Continent Oil and Gas Association; W. M. Vaughey, Mid-Continent Oil and Gas Association, Mississippi and Alabama Division; J. E. Warren, American Association of Oilwell Drilling Contractors.

DISTRICT 4

W. H. Ferguson, chairman, Continental Oil Co.; H. Earl Clack, E. Earl Clack Co.; George B. Cramer, Denver Powerine Co.; James Donoghue, Rocky Mountain Oil and Gas Association; Robert W. Hendee, Colorado Interstate Gas Co.; Henry D. Moyle, Wasatch Oil Refining Co.; Gilbert J. Mueller, Argo Oil Corp.; Burton W. Musser, Utah Oil Refining Co.; Glenn E. Nielson, Husky Refining Co.; M. H. Robineau, Frontier Refining Co.; H. A. Stewart, The Texas Co.

DISTRICT 5

Reese H. Taylor, Union Oil Co. of California; L. L. Aubert, Bankline Oil Co.; C. S. Beesemyer, General Petroleum Corp.; Don E. Gilman, Western Oil and Gas Association; Harold E. Howard, Howard Supply Co.; A. A. Jergins, San Joaquin Valley Oil Producers Association; C. A. Johnson, Independent Refiners Association of California; M. W. Kibre, California Natural Gasoline Association; M. A. Machris, Wilshire Oil Co.; A. C. Mattei, Honolulu Oil Corp.; W. E. Moeller, Jr., Southern California Gas Co.; S. B. Mosher, Signal Oil & Gas Co.; E. R. Valentine, Fullerton Oil Co.; Edgar A. Waite, Standard Oil Co. of California; C. P. Watson, Seaboard Oil Co.; W. C. Whaley, Oil Producers Agency of California; V. R. G. Wilbur, California Stripper Well Association.

New 2,000-Hp. Gas-Turbine Generator Burns Bunker C Fuel Oil

by Thomas J. Putz*

AN experimental 2,000 hp. gas-turbine generator set that weighs only 19 lb. per horsepower and starts in 1½ minutes or less has been developed for plant, locomotive, and other applications. Occupying only ¼ cu. ft. per horsepower, its light weight, compactness, and quick starting and loading response, for example, make possible a gas-turbine-electric locomotive less than half the length and two-thirds the weight of the lightest of other types.

Burning No. 6 (Bunker C) fuel oil to compensate economically for an expected thermal efficiency of its simple open cycle of 20 per cent at full load, the gas-turbine generator set operates at a top temperature of 1,350° F. This is the maximum practical temperature using currently available materials without resort to cooling.

The simples type of open cycle, consisting of only a compressor, combustor, and turbine is employed in order that operating experience on these major components may be most quickly acquired, and the useful output is absorbed by a double-armature d.c. traction-type generator connected to the turbine through a single reduction gear. Tests to date indicate smooth mechanical performance.

Applications such as portable power plants in the gas fields, power units for gas transmission lines, and power plants for factories where circumstances make it advantageous are all attractive possibilities.

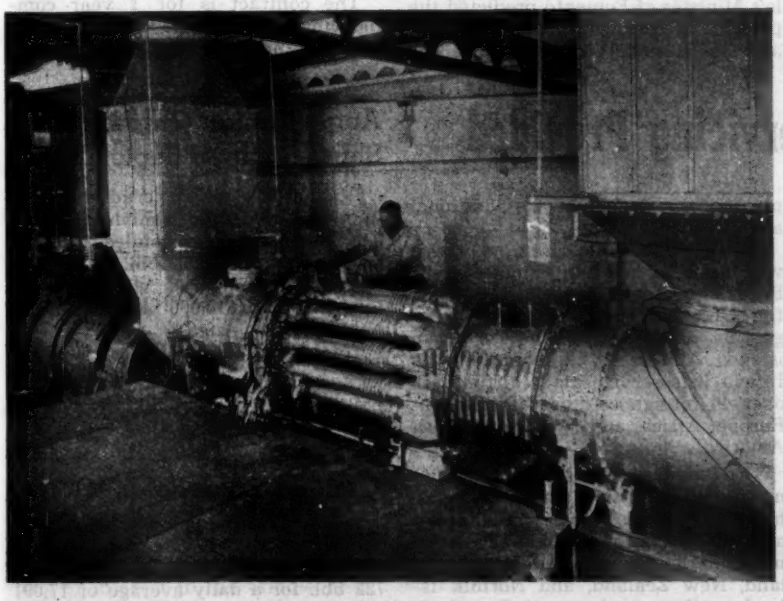
*Manager, gas and locomotive-turbine section, steam division, Westinghouse Electric Corp., South Philadelphia, Pa. This article is from a paper presented at the recent annual meeting of the American Society of Mechanical Engineers in New York.

Simple in Operation

In operation air is taken in by the compressor through the inlet metering nozzle and silencer and compressed to pressures of 30 to 75 psia., depending on the load carried. Fuel oil is mixed with the compressed air and burned in the combustors, the amount of fuel burned being controlled to limit the temperature of the gases to between 700° and 1,350° F. at the combustion-chamber outlets. The hot gasses are expanded through the power-producing turbine, and the resultant exhaust gases pass through a diffuser, elbow, and silencer to the atmosphere.

The turbine develops approximately 6,000 hp., of which 4,000 hp. is used to drive the compressor. The remaining 2,000 hp. is the useful output delivered to the d.c. generator. The full-load speed of the turbine and compressor is 9,200 r.p.m. while the generator speed is 1,200 r.p.m.

The complete assembly measures 26 ft. long, ½ ft. wide, and 6 ft. high. Components are arranged in order from one end to the other of exhaust diffuser and elbow, gas turbine, combustors, compressor, single reduction gear, and d.c. generator. The straight-line arrangement saves piping, space, and weight and keeps pressure drop to a minimum. The total weight of 38,000 lb. is divided approximately one-third to the turbine, compressor, combustors, and gear; one-third to the bedplate and accessories; and one-third to the generator.



The 2,000-hp. gas-turbine generator set on test. Silencers are mounted in the inlet and exhaust ducts. Many gage lines and thermocouple leads on this first unit permit performance evaluation

Colorado Officials Contract For Rangely Tax Appraisal

DENVER. — The County Commissioners of Rio Blanco County, Colorado, following a series of conferences with the Colorado State Tax Commission, have awarded a contract to Pritchard & Abbott, valuation engineers, of Fort Worth, to make an appraisal of properties in Rangely field for taxation purposes.

The survey will cost approximately $25,000. Thirty employes of the firm will begin work February 15, and expect to finish by the middle of June. This will be the first appraisal of oil properties in the state by independent sources and is expected to set a precedent for the taxation of other fields in the state.

The decision to have the appraisal made followed considerable agitation for a severance tax to be set up by the legislature at its next session opening in January, but this proposal met with considerable opposition. One objection was on the ground that a severance tax would have to apply to all mineral production and would prove detrimental to the mineral mining industry. Another objection, pointed out by the attorney general, is that a severance tax is in effect an excise tax and that under the state constitution, 85 per cent of revenue from such a tax would accrue to the state's old-age pension fund.

Heat, Power Firm Will Acquire Taylor Refining

NEW YORK.—Acquisition of Taylor Refining Co., Taylor, Tex., by Petroleum Heat & Power Co. was approved last week at a special meeting of the company's stockholders. Issuance of $1,000,000 additional shares of common stock, $2 par value, was authorized. K. G. MacCart, president, said 912,464 shares will be exchanged for the entire capital stock of the refining company.

International

WORLD-WIDE OIL DEVELOPMENTS

Venezuelan Assembly Approves Permanent Surtax Plan

CARACAS. — Venezuela's National Constituent Assembly enacted on December 28 a so-called permanent progressive surtax on profits. The tax reportedly is 28 per cent, with about 40 industries affected. Oil companies pay about 50 per cent of all Venezuelan taxes.

Under the new tax, the government may allow reductions up to 4 per cent providing a certain amount of capital is reinvested. This is a factor which may in some cases lower the actual percentage to be paid for 1946.

Annual incomes in excess of 500,000 bolivars (about $150,000) are affected. Incomes of more than 28,000,000 bolivars (about $8,400,000) will be subject to full amount of tax minus the four per cent if the money is reinvested.

Oil companies subjected to Venezuela's excess-profits tax, enacted at the last minute in 1945, have long known that the present permanent tax would be enacted and have only expressed the hope that it would be reasonable. Apparently it is thought not too much out of line as indications are that refinery construction and expansion in other petroleum activities amounting to millions of dollars will continue in 1947. Last year's extraordinary surtax resulted in an increased revenue to the Venezuelan Government of 100,000,000 bolivars (about $30,000,000). The year-end extraordinary tax in 1945 ranged from 6 to 20 per cent which in some cases brought total tax to around 32 per cent. The 1946 permanent surtax is somewhat lower. In a New York press conference last September Venezuela's Minister of Fomento predicted the present excess profits tax. (The Oil and Gas Journal, October 5, page 42).

World-Wide Air Servicing Provided

NEW YORK.—The new agreement between two companies, Intava, Inc., and Standard-Vacuum Oil Co., and the Joint Army-Navy Petroleum Purchasing Agency for the supply of petroleum products and other services to Army Air Forces planes is believed to be the largest of its kind ever entered into by the U. S. Government.

Intava, Inc., international aviation-servicing organization of Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., will greatly increase its services to the Government under the contract, particularly in Germany and South America. In addition to into-plane servicing of aviation gasoline and engine oil to AAF aircraft in Berlin, Bremen, Frankfort, Wiesbaden, and Eschborn, Intava will supply storage depots at 20 additional airfields in Germany.

Intava's South American operations will cover airfields in Chile, Bolivia, Peru, Equador, Venezuela, Columbia, the Guianas, Brazil, Paraguay, Argentina, and certain of the Caribbean islands. Altogether, the contract with Intava lists service at 88 airfields in over 40 foreign countries throughout Europe, Africa, and North and South America.

The Standard-Vacuum contract signalizes the first time an oil company has entered into direct refueling of aircraft at Canton Island; Viti Levu in the Fijis; New Caledonia; Auckland, New Zealand, and Norfolk Island.

Moreover, all commercial planes will be served as well as fueled. Additional points to be served by Standard-Vacuum under similar arrangements include four Chinese air terminals near Hankow, Nanking, Peiping, and Shanghai. The contract calls for the oil company to provide services formerly handled by the U. S. Army Air Forces at all nine locations.

Canton and the other island points are stepping stones for commercial planes en route from the United States to Australia and New Zealand, Walter Palmer, Standard-Vacuum aviation head, pointed out. Before the war, the air lines looked after their own refueling arrangements.

Increased trans-Pacific air travel, with several competing lines now using the same field at some points, makes it possible to provide "fill-it-up" service at a saving to all concerned, Palmer said.

Standard-Vacuum plans additional storage facilities and refueling equipment at all nine points as soon as the volume of traffic justifies the expenditures. Use of the oil company's trained men will permit the Army Air Forces to relinquish duties which up to now have had to be handled by U. S. military personnel.

The contract is for 1 year commencing January 1947. It was awarded under competitive bidding.

Anglo-Iranian Output Shows Gain in September

LONDON.—Iranian crude-oil production, by Anglo-Iranian Oil Co., Ltd., for September totaled 1,572,000 tons (about 11,004,000 bbl.) or 366,800 bbl. daily, compared with 1,545,000 tons (about 10,815,000 bbl.) or 348,800 bbl. daily for August.

Total Iranian production from January 1 of this year through September 30 was 14,296,000 tons (100,072,000 bbl.).

Trinidad Leaseholds' Output

Crude-oil production during November by Trinidad Leaseholds, Ltd., from its own fields only totaled 530,722 bbl. for a daily average of 17,691 bbl. September production was 543,436 bbl., with the daily average at 18,155 bbl.

Russian Concession Before Iranian Parliament Despite Deadline

International

TEHERAN.—Ratification of the proposed Soviet oil concession in Azerbaijan and four other northern Iranian provinces is still the first major item facing Iran's new Majlis (Parliament), when members of the body are elected and in session—sometime within the next 3 months.

Iran's Premier Ahmad Ghavam explained that proposals for the Soviet-Iranian Oil Co., in which the Russians will control 51 per cent of the stock, were first officially recognized last April. (The Journal, April 13, p. 70).

However, whether Russia will maintain its proposed 51 per cent interest is now a matter of speculation in view of the fact that the regime in Azerbaijan has collapsed and Premier Ghavam has regained control. When the proposed Russian oil concession was presented to the Iranian Government, early this year, it was under duress, and the Iranian Government, consequently, may insist that the terms be altered now that Iran has regained sovereignty in the northern area.

Asked if the American oil men had shown an interest in obtaining an oil concession in southern Iran, had resumed negotiations, the premier said that up to the middle of December he had heard of no proposals and that the subject had not been brought to his attention.

Sources close to the U. S. State Department pointed out that more than 2 years ago the Iranian Parliament went on record as refusing to discuss concession questions further until foreign troops were off Iranian soil. The Russians continued to press for a concession, and last April formation of a Soviet-Iranian company was announced. Despite constant pressure, the Iranian administration has held that a duly elected Majlis must ratify the proposal.

The Soviet concession was to have been approved by the parliamentary body by October 24 of this year, but the premier's statement that it will be on the agenda of the next Majlis shows the proposal is still active.

Standard-Vacuum Oil Co., jointly owned by Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., has been reported as interested in a concession in southern Iran. The Seaboard Oil Co. is another American oil firm which reportedly has shown renewed interest in the Middle East.

Whether the Russians have actually done any drilling in Iran's northern provinces — controlled by Iran's left-wing Tudeh party to such an extent that only recently have Iranian government troops reentered Azerbaijan—has been a topic of considerable speculation.

William S. Haas, former Iranian adviser to the Ministry of Education, states in his book, "Iran,": "The Russians had been prospecting for oil before the war in northern Iran, particularly in Mazanderan. But it was the policy of Reza Shah to delay drilling as long as possible. After the occupation the Russians began to drill in the occupied zone, and they asked for other concessions in the Kavir region, south of the Elburz Mountains."

The proposal for the joint Iranian-Soviet company was outlined last April in a letter sent by the Iranian premier to the Russian Ambassador in Iran. It designated an area of operations for the company in northern Iran and also a section west of this area which the Iranian government would not lease to foreign or foreign-controlled companies. Interest in the company was to be 51 per cent Russian and 49 per cent Iranian the first 25 years, and equally divided the second 25 years.

Oil Prominent in Program For Resources Conference

NEW YORK.—Petroleum geologists and engineers from the United States and practically every other country which has indigenous production of oil and other mineral resources are expected to attend a World Conference on Mineral Resources in New York City, March 17-19 at the Waldorf-Astoria Hotel.

The meeting will be in conjunction with the seventy-fifth anniversary celebration of the American Institute of Mining and Metallurgical Engineers.

Among oil men, prominent in both the U. S. domestic and international fields, who will address the world conference are: John R. Suman, vice president, Standard Oil Co. (N. J.); John M. Lovejoy, president, Seaboard Oil Co.; Sir William Fraser, chairman, Anglo-Iranian Oil Co., Ltd.; Robert E. Wilson, board chairman, Standard Oil Co. (Ind.); and P. C. Keith, president, Hydrocarbon Research, Inc.

Pedro Beltran, former Peruvian ambassador to the United States, will address the conference on "Latin-American Minerals in the Future World Economy." J. A. Krug, secretary of the interior, will speak on "Mineral Resources of the United States," and Spruille Braden, assistant secretary of state, will discuss "American Mining Enterprise in Foreign Countries." J. T. Sherman, A.I.M.E. hotel-committee chairman, has urged those planning to attend to make hotel reservations early.

Seven Countries Now Have Buying Missions

WASHINGTON.—A revised list of persons in charge of petroleum purchasing missions of foreign governments in the United States shows seven governments with such missions.

The countries, names of the men in charge of the missions, and their addresses are given in the following list, compiled by the National Petroleum Association.

Argentina.—Ing. Benazar, commercial attache, Argentine Oil Field Commission, 80 Broadway, New York.

Belgium.—A. Varchaver, commercial attache, metals and minerals department, 2136 R. Street, NW., Washington, D. C.

China.—A. J. Walsh, Chinese Mission, and J. P. McElligolt, lube buyer, Chancery, 2001 Nineteenth Street, NW., Washington, D. C.

France.—J. Galligue, chief, Petroleum Section, 1722 Massachusetts Avenue, NW., Washington, D. C.

Great Britain.—H. W. Samson, 50 West Fiftieth Street, New York.

Royale D'Afhghanistan.—Mohammed Choriaid, consulate, 340 Riverside Drive, New York.

Spain.—J. M. Careaga, Spanish Embassy, 2700 Fifteenth Street, NW., Washington, D. C.

Swiss Refinery May Begin Operating Soon

Expected to begin operations early in 1947 is the new refinery at Rotkreuz, Switzerland. The refinery, located between Lucerne and Zurich, was built early in the war by Italian interests but never began actual operations. It has since been taken over by another group, including some Geneva interests, according to reports in London.

Anglo-Mexican Absorbed

NEW YORK.—All normal business functions and operations of Anglo-Mexican Petroleum Corp. were transferred recently to an associated company, Asiatic Petroleum Corp., a subsidiary of the Royal Dutch Shell group, in a move effective January 1.

Second Major Middle East Deal Disclosed; Jersey, Socony to Buy Iranian Crude

by Warren W. Burns

International

Statistical data on fields and refineries in the Middle East were included in two features, "Survey of World Oil Fields" and "Survey of World Oil Refineries," published in The Oil and Gas Journal's Annual International Number, December 28, pp. 187 and 197. The status of oil properties in Middle East areas was discussed in a separate article in the International Number, page 171.

NEW YORK.—Upwards of 100,000 bbl. daily of crude oil will be purchased over a 10 to 20-year period by Standard Oil Co. (N. J.) and Socony-Vacuum Oil Co., Inc., from the Middle East petroleum concessions of Anglo-Iranian Oil Co., Ltd., whose stock is 56 per cent owned by the British Government.

Confirmation of the preliminary agreement, in which "substantial quantities of crude oil" are involved, was made in New York late last week by the two American companies and in London by Anglo-Iranian.

But no official disclosure has yet been made that Jersey Standard, Socony-Vacuum and Anglo-Iranian may conduct negotiations jointly with Arabian American Oil Co. looking toward the construction of a single "big-inch" pipe line from the Persian Gulf area to some Mediterranean port. The fact that Jersey Standard, Socony-Vacuum, and Anglo-Iranian are contemplating the construction of their own pipe line was revealed by the companies themselves in stating that the preliminary agreement "provides for prior investigations of the possibility" of such a project.

Arabian American has had the projected construction of a 1,200-mile trans-Arabian crude pipe line under consideration for well over a year. This line would extend from some area in the Persian Gulf to an undisclosed Mediterranean port.

It has been revealed that Jersey Standard and Socony-Vacuum, as part of their deal to share ownership in Arabian American, were also negotiating to obtain an interest in the projected trans-Arabian line. (The Oil and Gas Journal, December 21, page 43.) Now it appears that Anglo-Iranian may be another partner in the same project, and that a feeder line will be built from the independent sheikdom of Kuwait, where Anglo-Iranian holds a half interest in Kuwait Oil Co., Ltd., now producing 40,000 bbl. daily. The other half is held by Gulf Exploration Corp., a subsidiary of Gulf Oil Corp. Gulf, however, reportedly is not involved in the current negotiations.

If Jersey Standard, Socony-Vacuum and Anglo-Iranian should build their own line, it would run from 850 to 1,000 miles, according to well-informed sources here.

The tremendous cost of building and maintaining desert towns around the pumping stations has resulted in Jersey Standard and Socony-Vacuum looking at the possibility of constructing a single "big-inch." And while many details still remain to be ironed out, it has been learned on excellent authority that every effort will be made towards the construction of a single line, instead of two as indicated.

Proposed Pipe-Line Capacity

Engineers vision a 30-in. Middle East line so designed, by the appropriate spacing of pump stations, as able to handle approximately 500,000 bbl. of crude daily. Within the next 15 years it is hoped that over 1,000,000 bbl. daily of crude oil will be reaching the Mediterranean. Whether additional pipe-line capacity will be built to bring this about, or whether tankers are to be used, is not known.

If the companies all agree on a single line, it is expected that it will be 1950 or 1951 before it is completed, depending, of course, on the availability of materials and equipment, and on how soon pending negotiations between Jersey Standard, Socony-Vacuum, and Arabian American, on one hand, and the same two companies with Anglo-Iranian, on the other, are consummated.

Barge-loading operations at Abadan at the head of the Persian Gulf where the world's largest refinery is operated by Anglo-Iranian Oil Co., Ltd. The 4-gal. tins are being loaded for local trading purposes

The two deals are not related except for whatever may develop if all concerned join forces in the construction and operations of a single Mediterranean pipe line.

Commenting on the Anglo-Iranian negotiations, Jersey Standard said: "It is expected that under such a contract the volume of Jersey's crude oil purchases would increase gradually over the period of the agreement to meet the expected increase in world demand for petroleum products."

The first official disclosure of the percentages which Jersey Standard and Socony-Vacuum probably will acquire in Arabian American's ownership were made by the companies last week when they confirmed the Anglo-Iranian negotiations. A 30 per cent interest is seen for Jersey Standard, and a 10 per cent interest for Socony-Vacuum. No official statement has been made as to the amount of money involved in the Arabian American transaction, but $225,000,000 is a rumored figure.

"While agreement in principle has been reached with Arabian American, its final conclusion is contingent upon satisfactory completion of surveys and discussions now in progress," Jersey Standard states. On Christmas day, the Jersey Standard and Socony-Vacuum representatives, who had flown to Arabia, returned. (The Journal, December 21, pp. 42 and 44.)

Price Bases Not Known

Exactly on what basis the purchase price of crude from Anglo-Iranian will be determined is not readily available. However, it is interesting to note that early this spring James Terry Duce, vice president of Arabian American, made the following remarks concerning Middle East crude prices, and his observations seem more pertinent today than they were several months ago:

"It would seem to me quite certain that the price of petroleum products on the American Gulf will only remain an index of prices on a world basis as long as there is a fairly free market for crude and products in that area. It has always been possible over the last 20 years to buy spot cargoes in the Gulf—at one time in Mexico and other times on the Gulf Coast and occasionally in Venezuela. The inevitable trading backwards and forwards has thus established the prices for other areas of the world.

"Now, however, we come to a condition where the reserves in the Middle East are very large—larger indeed than those of any other area in the world—and where a number of companies are producing oil competitively. This competition between the companies will, to my mind, be further enhanced by the desire of the individual countries to profit as much as possible by the revenues from oil.

"It would follow naturally at a later date that the Near East will be the area from which oil is invading new markets and I would expect that within a reasonable number of years, the market price of oil products will be determined on a world basis by their price at Eastern Mediterranean ports and in the Persian Gulf."

"This will be doubly true if the United States Government in the course of its national oil policy decided to materially increase the tariff, and the United States production runs at a rate sufficient only for internal purposes. However, the fact must be borne in mind that because of the wide variety of crudes available in the United States, the United States will always be a source of oil specialties such as high-grade lubricating oils. In other words, at some time in the next decade, I expect Near Eastern oil prices will become the world base."

Stating that the partnership negotiations with Arabian American and the proposed crude-oil purchase agreement with Anglo-Iranian are both aimed at bringing Jersey Standard's future crude-supply position, in the European areas, gradually into balance with its expected market demand, the Jersey Standard statement explains:

"Affiliates of the company now supply some 20 per cent of this market, primarily from the Western Hemisphere since the company now has considerably less than 5 per cent of the Middle East crude oils to supply this market.

"Anticipated pressure on Western Hemisphere crude-oil supply, which over the next 2 decades is expected to be about equaled by the increasing Western Hemisphere demand, would thus be relieved by gradually substituting Middle East for Western Hemisphere crudes.

"Another result of these proposals would be to make crude oil available to Standard-Vacuum Oil Co., a 50 per cent owned Jersey affiliate (the other 50 per cent being owned by Socony-Vacuum) with producing, refining, and marketing operations in the Far East. This would materially strengthen Standard-Vacuum's position as this company before the war produced oil only in the Netherlands East Indies and this production was never sufficient to meet the market demand in the Far East."

Due to the unsettled political conditions in the relatively new Republic of Indonesia (N.E.I.), Standard-Vacuum has not yet been permitted to inspect its prewar oil-production facilities in fields on the Island of Sumatra, where—except for a daily 1,000 bbl. production in East Java—some 650 wells provided a 40,000 bbl. daily output.

Some time in 1947, depending on

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when construction of the badly damaged 47,000-bbl. daily refinery at Palembang gets under way, the initial postwar output is expected to be approximately 20,000 bbl. daily, according to Edward Liebacher, general manager of Nederlandsche Koloniale Petroleum Maatschappij, Standard-Vacuum's N.E.I. operating company. It probably will be at least 2 years before the Palembang refinery goes back on stream at the prewar capacity.

Socony-Vacuum foresees "a greatly increased world-wide demand for petroleum products," according to a short statement released last week. "And if the negotiations now under way are successfully concluded," the company explained, "these new sources would provide crude for Socony-Vacuum's foreign markets west of Suez and also be available to help supply the markets of Standard-Vacuum east of Suez." Standard-Vacuum, it was said, "was unable, even with its prewar production of approximately 41,000 bbl. per day, to meet demands."

"The arrangements will also be helpful in bringing about the supplying of Eastern Hemisphere markets with Eastern Hemisphere crudes," Socony states, "and at the same time will make fully available Western Hemisphere crudes for growing Western Hemisphere needs."

Production to Be Stepped Up

Jersey Standard's and Socony-Vacuum's only source of Middle East crude at present is through their 23.75 per cent partnership (in which they operate as the Near East Development Corp.) with Iraq Petroleum Co., Ltd., and amounts to about 10,000 bbl. a day for each. Current production of 85,000 bbl. daily in Iraq's Kirkuk field will be stepped up to about 275,000 bbl. on completion of a 620-mile 16-in. pipe line which is to parallel the existing 12-in. line to Tripoli and Haifa.

As Jersey Standard and Socony-Vacuum increase their Middle East crude-oil supply, it is certain that a large percentage of it will go to the European refineries owned by these companies.

When the Anglo-Iranian negotiations are completed, Jersey Standard and Socony-Vacuum will be buying crude from Kuwait and Iran. In Kuwait, where current production of 40,000 bbl. daily will be increased substantially next year, the proved reserves of oil and condensate are approximately 10,000,000,000 bbl., according to an April 30, 1946, statement made by E. DeGolyer, internationally known geologist.

International

In Iran, where probable reserves are 10,000,000,000 bbl., increased production is largely a matter of more pipe lines, which are being built, and of increasing the output of the relatively few wells which are producing far under their potential.

Iranian production is coming largely from the following four fields: Masjid-i-Sulaiman, which is on the downgrade, Haft-Kel, Agha Jari, and Gach Saran. While the daily output of Gach Saran is now only about 40,000 bbl., it is stated that the daily potential here is approximately 450,000 bbl. The structure is not yet fully outlined. Anglo-Iranian geologists and engineers believe that Gach Saran will prove to be one of the world's largest oil fields. Probable reserves at Gach Saran are well in excess of 4,000,000,000 bbl.

Total Iranian production is now approximately 400,000 bbl. daily, and the Abadan refinery throughput is about the same. For a 10-day period, last November, Abadan ran 437,000 bbl. daily. According to information on current negotiations of Jersey Standard and Socony-Vacuum with Anglo-Iranian, it is not expected that the two American companies will obtain any products from this refinery.

Anglo-Iranian's tanker fleet, which suffered heavily during the war, is now back to its postwar status, with approximately 100 tankers totaling over 1,000,000 DWT. An additional 25 to 40 are being built and bought.

The U. S. State Department, the Department of Justice, and other agencies of the U. S. Government are cognizant of the Jersey Standard and Socony-Vacuum Middle East operations, and reportedly have approved all proposed transactions.

Union Oil Stepping Up Exploration Work in Paraguay's Chaco

PLANS for pushing the exploratory program in Paraguay with even more vigor in 1947 and for expansion of operations into parts of Central America are well advanced by Union Oil Co. of California. Union is expected to make final selection soon of its second drill site, and the operating company is now negotiating with Western Geophysical Co. for a third crew to Paraguay.

Union Oil Co. 1 Santa Rosa, the first drilling operation ever attempted in the Paraguayan Chaco, is drilling below 7,348 ft. in formations tentatively identified as Devonian, although this interpretation is subject to further analysis.

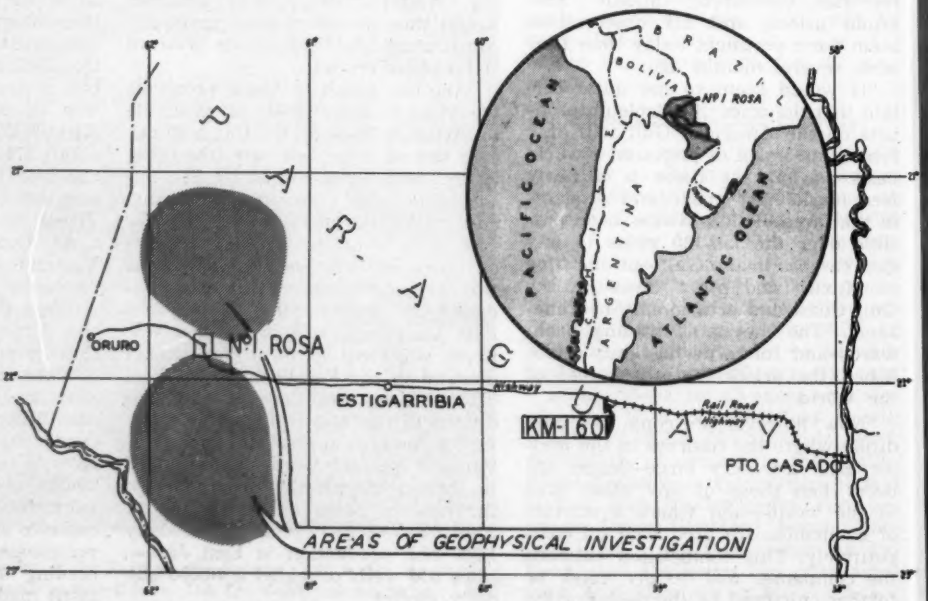
Three or four possible locations are under consideration for the second drilling operation, but Union's foreign-management group has not made final selection of the next to be tested at end of the year. No predetermined depth has been selected for stopping the first well which will be continued as long as practicable or until either a productive zone or an igneous barrier is encountered. The drilling well is about 255 miles west of Puerto Casado, a port on the Paraguayan River which is used as a supply transshipment point. The first drill site is near the military highway which runs from east to west across the Paraguayan Chaco. This was a natural selection because areas adjacent to the existing highway were the most accessible to the first geophysical crew.

Subsequent geophysical work, supplemented by a second crew which started work in the Paraguayan Chaco the middle of 1946, has been generally north and south of the first drilling operation.

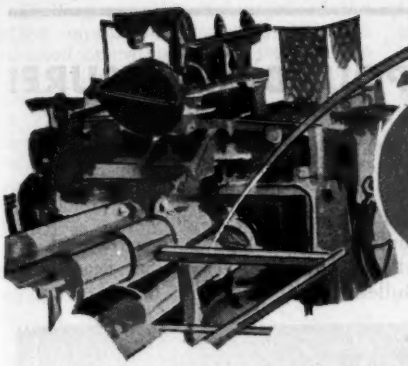
When weather permits unfettered operations, the geophysical parties often are completing 300 profiles per month. This rate of progress will be accelerated approximately 30 per cent when the crew now being assembled and equipped is on the ground and in operation.

Union's exploratory agreement with Paraguay was signed in May 1944. The government granted the company exploratory privileges over the entire Chaco, which consists of approximately 56,000,000 acres, for a period of 10 years. Total acreage has been divided into investigation blocks each containing approximately 25,000 acres (10,000 hectares) until either oil is discovered or the parcel released by the operating company. If oil is discovered, a reserve of 2,000 hectares (4,942 acres) surrounding the productive well accrues to the company for exploitation over a period of 35 years. An extension of the original exploitation period for 15 years is provided, but the maximum time during which the company can hold the acreage is 60 years from date of the original contract.

The company is contemplating provision of heavier drilling equipment for the second exploratory well, although the National 75 with 136-ft. derrick and extra pumps, utilized on the first test by Drilling & Exploration Co., the drilling contractor, has performed satisfactorily. Union's management is awaiting recommendations from supervisors of drilling operations at the drill site before deciding on the substitution of heavier equipment.



Areas where Union Oil Co. of California is now conducting exploration operations in Paraguay



Youngstown to COLOMBIA

COLOMBIA is one of the more recent arrivals among the great oil-producing countries of the world. Following the discovery of oil in 1921 in the DeMares concession in the Middle Magdelena Valley, crude production rose to better than 50,000 barrels a day. For the past twenty years it has continued steadily at close to 20 million barrels a year average, close to that of Argentina and the state of Arkansas.

Proven reserves estimated at a billion barrels, with great possibilities in unexplored regions, give promise of a major place for Colombia in the world markets of tomorrow. Oil men of this foward looking republic have found full value and dependability in Youngstown casing, tubing, drill pipe and line pipe. Here, as in every other oil-producing region, the orange band on pipe is recognized as the hallmark of quality.

Youngstown is identified by the orange band or bands.

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Coke Tin Plate-Electrolytic Tin Plate-Rods-Wire-Cold
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. . . . a job for a HORTONSPHERE!—the logical pressure tank for highly volatile products. The Hortonsphere gives you top protection from evaporation losses, a reduction in fire hazard, maximum economy of operation and dependable service.

The Ashland Oil & Refining Company used five Hortonspheres during the war to store volatile hydrocarbons at its aviation gasoline plant near Catlettsburg, Ky. The photo below shows one of the Hortonspheres at this location. It is 38 ft. in diam., holds 5,000 bbls., and operates at 100 lbs. per sq. in. pressure.

If you are handling volatile liquids or gases—get full details on the Hortonsphere from our nearest office. Ask for Bulletin F.

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New York, 6	3347-165 Broadway Building	Houston, 1	5619 Clinton Drive
Cleveland, 15	2204 Guildhall Building	Philadelphia, 3	1615-1700 Walnut Street Building
Los Angeles, 14	1423 Wm. Fox Building	Washington, 4	703 Atlantic Building
Atlanta, 3	2154 Healey Building	San Francisco, 11	1254-22 Battery Street Building
Birmingham, 1	1536 North 50th Street	Detroit, 26	1514 Lafayette Building

Plants in BIRMINGHAM, CHICAGO and GREENVILLE, PENNA. In Canada: HORTON STEEL WORKS, Limited, FORT ERIE, ONT.

Drilling supplies and much of the other equipment required for this isolated operation in the Paraguayan Chaco is shipped via Montevideo or Buenos Aires up the Rio Paraguay to Puerto Casado on the Brazilian border. Supplies are transshipped at this point via a narrow-gage privately owned railway to Kilometer 160, alcng the military highway, which is roughly 155 miles east of 1 Santa Rosa, the drilling well. From Kilometer 160, the western railhead, equipment and supplies must be moved the remaining 155 miles via motor transport. Union's contractors have built the portion of the road from Mariscal Estigarribia on west and north to the location of 1 Santa Rosa.

Union's negotiations for other exploratory concessions in Guatemala and possibly other South and Central American countries are under way. The basic contract between Paraguay and Union is acceptable to the company which recognizes and is prepared to defray the exceptionally high costs of pioneer exploration in territories which offer even a remote possibility of yielding petroleum.

This particular point, for example, delayed the filing of an over-all application on the Chaco of Guatemala. Attorneys for the government and Union are now attempting to resolve their differences and will soon agree, it is felt, on lawful procedure. The Guatemalian government, it is understood, considers favorably Union's proposal, which follows rather religiously the framework of the Paraguayan contract. The only difference of opinicn centers around the proper procedure in filing the application for concession.

Byproducts Big Factor In Shale-Oil Production

Output of byproducts is expected to exceed the production of oil by the time the construction plans of Swedish Shale Oil Co. A.B. are completed.

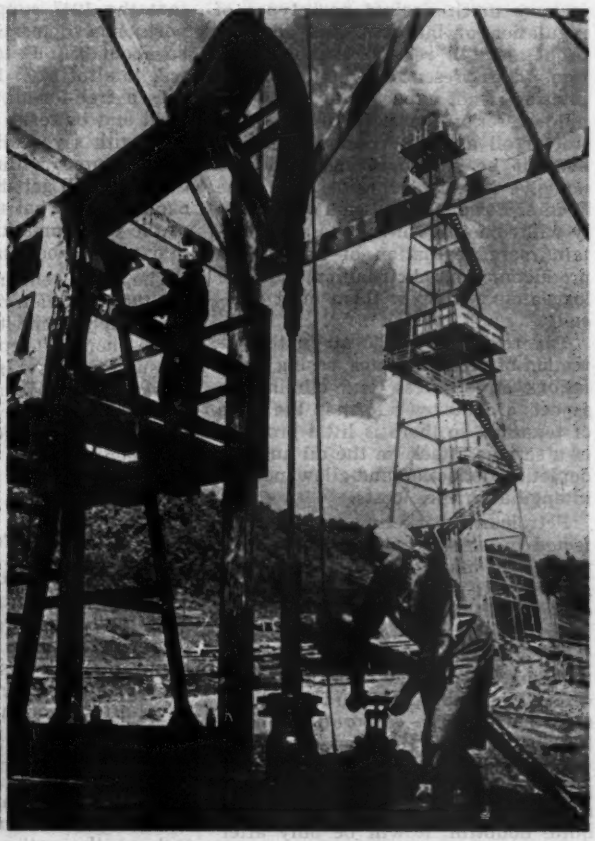
The company now produces more than 2,200 tons of sulfur monthly and more than 7,060,000 cu. ft. of gas daily

International

in its oil-production efforts. The company's plants at Kvarntorp, according to information received by the U. S. Department of Commerce and published in the Foreign Commerce Weekly, also produce ammonium sulfate, tar, and quicklime.

Bolivian Loan Anticipated

The Exort-Import Bank is favorably considering an additional loan of $3,000,000 to Bolivia for use in oil development and in the construction of the Camiri - Cochabama pipe-line project. In La Paz, officials of Yacimientos Petroliferos Fiscales Bolivianos (Bolivian Government Oil Fields) said the bank had advised it is "disposed to concede" the additional credit and that the $5,500,000 development plans of the government oil corporation will be expanded.



Russian officials report the discovery of two "sizable" flowing wells, one in the Tuimazin fields in Bashkiria and the other near the Zhiguli hills in the Kuibyshev (Samara) eastward bend of the Volga River. The wells have yielded the Soviet Union's first oil from strata found in the Devonian, according to the Russian reports. A well some 600 miles from the Samara bend is reported to have produced some 200 tons (about 1,400 bbl.) daily from a depth of 1,650 m. (about 5,400 ft.). Development of the new oil-producing district between the Volga and the Ural Mountains was said to be offering serious competition in output to the Baku fields on the Caspian Sea. According to plans recently formulated, by 1950 the output of the Volga district will be 11 times that of 1940, and construction of new pipe lines and other installations is advancing. These two scenes are of operations in the Zhiguli Hills

WASHINGTON WATCHING

BY HENRY D. RALPH

Prospective Oil Legislation

WASHINGTON.—Legislation directly affecting the oil and gas industries should be less prominent in the Congress which convenes this week than in most sessions of the recent past.

Few bills which caused concern before or during the war are apt to be pressed for passage. Possible exceptions are ratification of the Anglo-American petroleum treaty, settling title to offshore oil lands, and amendments to the Natural Gas Act. Hundreds of bills will be dropped into the hopper, of course, but Congress is expected to remain in session no longer than 6 months this year, and most of its attention will be devoted to trimming down the budget and getting rid of wartime regulations.

The current mood on Capitol Hill is very much against new types of regulation of business, and all such proposals will receive a cool reception. The present secretary of the interior is not expected to renew his predecessor's request for federal control of oil and gas conservation, but even if he should, Congress would not give it serious consideration. The Federal Power Commission quite likely will come up with proposals to obtain more regulation of natural-gas production and distribution, but the legislators will view them most critically.

Tax revision will be all in the direction of reducing rates, easing regulations on business, and eliminating aspects of industry reform in the guise of taxation, so there is little prospect of a serious attack on the oil and gas depletion deduction and allowance for intangible drilling costs.

Petroleum marketing may be affected by some of the proposals certain to be made to aid business and reverse alleged monopolistic tendencies. Political champions of free enterprise are always responsive to cries that big business is getting bigger, so there may be considerable legislative discussions of proposals to force disintegration of large corporations in all lines of business. However, such laws will not be shouted through in a punitive spirit, and if anything of this nature is enacted in 1947, which seems quite doubtful, it will be only after long and careful deliberation.

Unrestricted Lead Use

ALL controls on lead and the use of tetraethyl lead in blending gasoline have now been removed except for the inventory and reporting requirements.

Yielding to the pleas of producers and most consuming industries, the Office of Temporary Controls has revoked the lead conservation order, M-38, the lead chemicals order, L-354, and the tetraethyl lead order, L-355.

This means that the manufacturers of ethyl fluid can make as much as they can find lead for and that refiners can use whatever ethyl fluid they can obtain in any way they please, with no more restrictions on the octane rating of either house-brand or premium gasoline.

Many government officials were reluctant to drop all lead controls at this time because there obviously will not be enough lead to satisfy all demands. The final report of the Civilian Production Administration estimated that the 1947 supply from both imports and domestic production will be about 850,000 tons, while demand will total at least 1,200,000 tons. Now it is a free-for-all market, and ethyl fluid and batteries will have to compete with toy soldiers and BB shots. The consumer willing to pay the highest price will get the most lead. However, this is what the industry asked, so the Government wiped the regulations off the books.

The only remaining lead controls are the limitation of inventories to 30 days' supply, and the requirement to make monthly reports of inventory, consumption and shipments of lead. Government purchase of foreign lead has ceased, and the Government's stock, now down to only 37,000 tons, has been reserved for emergency release by CPA.

Elk Hills Contract Defended

A VIGOROUS defense of the unit operating contract between the Navy and Standard Oil Co. of California in the Elk Hills Naval petroleum reserve has been made by Chairman Carl Vinson of the House naval-affairs committee in publishing the transcript of the hearings held last November on an amendment to the contract.

During those hearings Rep. Lyndon Johnson of Texas made a savage attack on the entire operation, charging that both the original contract and the proposed amendment were unfair to the Government. This attack went unanswered during the hearings but subsequently the chairman inserted a detailed answer in which he said that Johnson's assertions were "absolutely and unqualifiedly wrong in every particular."

The details of the charges and the answer are highly technical, but Vinson undertook to disprove the assertions that California Standard has been producing and selling Navy oil at great profit to itself, that the unit plan contract does not result in conservation of the Navy's oil, and that the contract contemplates that the party producing the oil should pay all expenses of maintaining the reserve. Rep. Jack Z. Anderson of California also filed a defense of the contract, saying that Johnson's "basic understanding of the principles and the facts is in error" and "predicated on false assumptions."

The hearing involved a request by California Standard for a revision in the contract to relieve it of part of the current costs of maintaining the reserve, since its permitted production of crude is less than was anticipated and insufficient to cover all costs.

Because of criticism from the committee, the Navy suggested a compromise amendment which was discussed briefly at the hearing and referred to California Standard for consideration. Standard has since rejected the Navy proposal and abandoned, at least for the present, all attempts to have the contract revised.

The Need for L.P.G. Cars

THE pressure tank-car situation is getting no better fast, and shippers of liquefied petroleum gas are facing the necessity of stopping deliveries to many customers unless some more cars turn up from some place to tide them over the winter peak demand.

The trouble started last fall when government officials began diverting tank cars from L.P.G. service to the Army's new program of manufacturing fertilizer for shipment to Japan and Germany to produce more food and reduce occupation costs. Vigorous opposition from the L.P.G. industry halted this diversion after some 45 cars had been transferred. The Government also directed car manufacturers to give scheduling priority on new cars in December and January to fertilizer producers, following which L.P.G. cars were to get some preference. At that time it was hoped that steel supplies would be sufficient to permit fabrication of enough cars to meet all essential demands this

winter, but this has not proved the case.

Deliveries of new pressure cars to date have totaled about 50, all fitted for liquid-ammonia service. Since last summer L.P.G. shippers have had orders on file for more than 1,000 new pressure tank cars, but not one has been delivered. They are currently bombarding the Office of Temporary Controls with requests that expansion of the fertilizer program be delayed a few months and that current production of new pressure cars be assigned to the L.P.G. industry until the cold weather is over, but so far they have had nothing but rebuffs from OTC.

The Unsettled Tideland Issue

OWNERSHIP of tideland oil will be a hot political issue in Washington again this spring. West Coast congressmen are expected to press new legislation relinquishing whatever claim the federal Government may have to the title to submerged lands under the so-called marginal sea between the tide mark to the international limit.

At the same time the Supreme Court will be considering the suit brought by the Justice Department to oust the state of California from ownership of tidal oil lands near Los Angeles—lands developed by private oil companies under state leases. This case has been scheduled for argument the first week in February, but it is expected that California will ask for a postponement in order to have more time to study the brief which the Government has not yet filed.

The Department of Justice is determined to press this case vigorously, and Attorney General Tom Clark probably will argue it in person. Although the Government says it affects only the right to lease oil off the California coast, the attorneys general of most states insist it involves the outright title and ownership of all submerged lands, including oyster beds, piers, wharves, reclaimed land, and everything else. The Government also says no court has ever passed on the question of state versus federal jurisdiction, though others say at least 50 Supreme Court decisions uphold the claims which the states have always assumed.

A resolution disclaiming all federal title to submerged lands was vetoed by President Truman last summer but the necessary two-thirds vote to override the veto was not obtained although originally it passed both houses by substantial majorities.

In the last Congress division on the tidelands issue was more on geographical than on party lines, so there is no assurance that the new Republican-controlled Congress will enact the measure in the face of another veto. Opponents will also raise the point of the propriety of Congress enacting legislation to decide a case pending in the Supreme Court.

The court's decision is due by late spring, before the end of the congressional session. If the court upholds California's claim there will be no need for legislation. If the Government wins the suit, Congress could still cede title to the states, but the legislation would meet much more opposition in the face of such a Supreme Court decision.

There is considerable speculation about the role of former Secretary of the Interior Harold L. Ickes in the tideland fight. Though he hasn't practiced law for many years, Ickes recently was admitted to the bar of the Supreme Court and it is rumored he may seek to intervene in the tideland case as a "friend of the court." It was Ickes who first publicly questioned state title to submerged oil lands, and who led the fight within the administration which culminated in legal action to assert federal ownership.

Relaxed Building Controls

THE petroleum industry can make plans for going ahead with major construction projects during the latter part of 1947, as a result of changes being made in the government's housing program.

For another 6 months or so a permit will be required from the federal Government for all nonhousing construction, whether a factory, filling station, laboratory, warehouse, or salesroom, but these permits will be increasingly easy to obtain. In recent months the volume of nonhousing construction permits issued has been limited to $35,000,000 per week, but this is to be raised to $50,000,000 very shortly. By spring the limit should be up to $75,000,000, and by midsummer the limit may be removed entirely.

Current high construction costs may deter some expansion plans, but most experts foresee a slight decline in costs within a few months. Both government and private sources report a rapid expansion of production of virtually all construction materials; dealers' inventories are very much improved and an oversupply of some building materials is being predicted unless industrial and commercial construction is increased.

Relaxation of construction controls is due partly to abandonment of the former policy of channeling everything into veterans' housing and partly to the belief of government economists that industrial and commercial construction must be increased to keep pace with postwar demands and to provide a needed outlet for heavy construction materials and equipment which would become surplus in a few months if the lid were kept on permits.

The Lube-Oil Can Supply

MORE "tin" cans will now be available for marketing lubricating oil, even though there will not be much tin in them, as a result of the action of the Office of Temporary Controls in removing all tin-plate controls which previously had channeled the major portion of tin-mill output into the production of cans for packing food.

One of the revoked orders set aside 70 per cent of all tin plate for certain essential foods and pharmaceuticals. Another required can makers to give preference to A, B, and C categories of orders. Lubricating-oil cans were in the B class but the canning of foods in the A class expanded so rapidly in 1946 that the lower-preference users got very few deliveries.

The action also opens the way for use of cans in packing beer, dog food, turpentine, and scores of other products, so lube marketers will still have to scramble for containers. Food and can manufacturers had asked to have the controls continued, at least until expiration of the Second War Powers Act March 31 because the supply of tin is expected to be far short of demands.

The Civilian Production Administration estimated that the 1947 world supply of tin will be about 141,600 tons, an increase of 47,200 tons over 1946 shipments, but world demand will be at least 190,000 tons against 1946 consumption of 145,600 tons. United States needs are expected to jump to 85,000 tons next year, an increase of 24,900 tons over 1946.

Merger of Three Gas Utility Firms Approved

JEFFERSON CITY, Mo.—Merger of Gas Service Co., Wyandotte County (Kans.) Gas Co., and Kansas City Gas Co. was approved here last week by the Missouri Public Service Commission, subject to approval by the Federal Securities and Exchange Commission.

The ruling said the consolidation will "combine under one corporate entity the property of all the applicants, thereby eliminating unnecessary corporate entities with cumbersome and complex corporate structures." Under the plan, the new stock issued would be purchased by Cities Service Co., holder of outstanding securities of all three utilities.

Shell to Give Second Bonus

A second cost-of-living bonus will be paid by Shell Oil Co., Inc., to all regular employes except officers in mid-January. The wage adjustment will consist of a week's basic salary, with no payment of less than $50 nor more than $175. First bonus was given Shell employes early in December.

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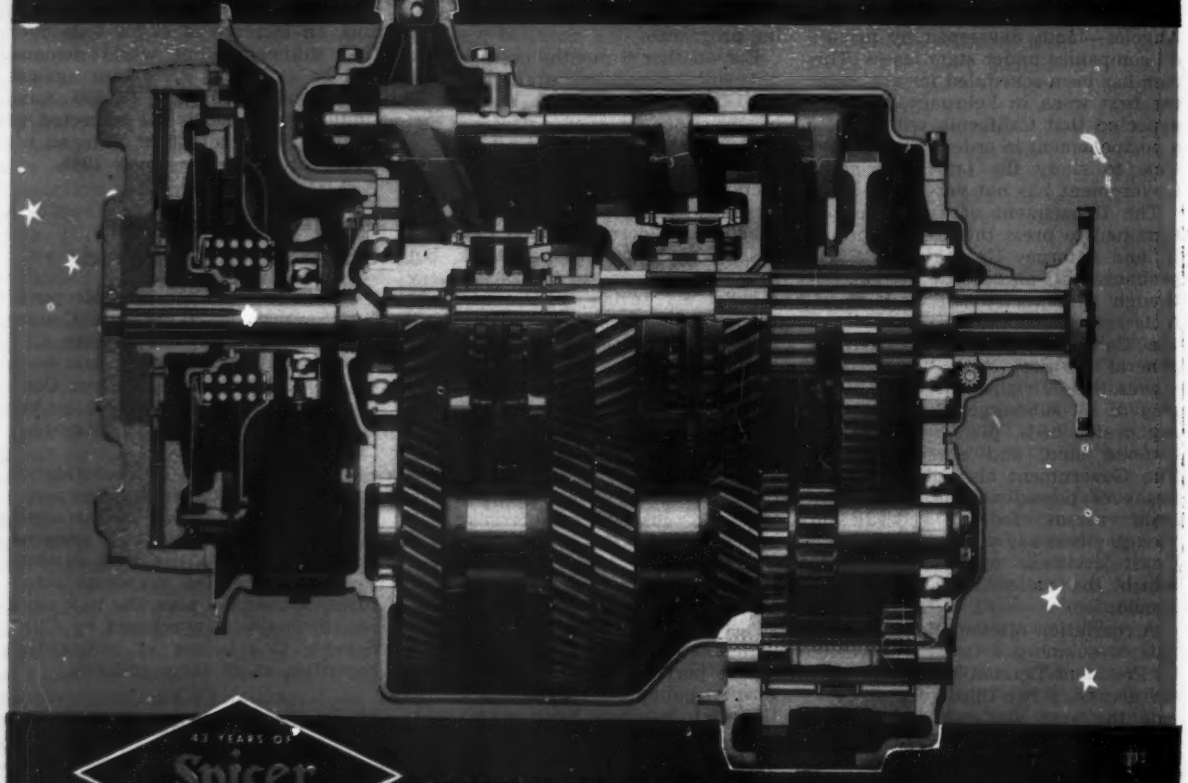

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Union Pacific Orders Diesels; Lays Off Miners in Shift to Fuel Oil

UNION PACIFIC RAILROAD CO. has announced in Denver the placing of an order with manufacturers for $22,000,000 worth of diesel-electric locomotives. At the same time the Union Pacific Coal Co. reported that 300 coal miners in the Rock Springs district in Wyoming had been laid off.

The two announcements are considered by oil men as indicating a shift by the railroad from coal to oil for fuel purposes and are looked upon as a move of outstanding importance. Union Pacific through its subsidiary has enormous coal deposits in Rocky Mountain states and has ranked sixth among the world's producers with an output of 6,500,000 tons a year, it being the largest single consumer.

However, in recent years it has become a major factor in the production of oil in Colorado and Wyoming. It has large holdings of producing oil land in Rangely field in Colorado which are being developed by The Texas Co. under contract and owns half of the 50,000 acres in the new Church Buttes district in southwestern Wyoming which a recent discovery has indicated may become the largest field in the area. It also has producing properties in other fields and has several million acres of potential oil land in the two states.

Labor troubles as well as economic factors are said to have figured in the decisions in the direction of oil power. The company now is said to be operating around 600 locomotives powered with fuel oil.

An indication of the seriousness with which the coal industry views the invasion of its markets was given earlier this month when the board of directors of the Bituminous Coal Research Institute, Inc., meeting in Pittsburgh, approved a $447,200 budget for cooperative research and development projects in 1947.

The funds will be used in an effort to further a more widespread acceptance of coal in industry and the home. The amount voted by the institute is $72,200 more than the allotment made for research in 1946 and seven times greater than the amount expended 4 years ago.

Coal operators have been particularly alarmed at the inroads made by gas and oil into the home-heating and small commercial market. About half of the institute's 1947 research projects are designed to improve coal-consuming equipment in this field.

The program, however, includes six projects on railroad locomotive coal utilization. Front-end cinder collection and disposal is to be studied in a new project, and work will be continued on air supply for locomotives, over-fire air jets to eliminate smoke, effect of fuel on locomotive performance, and handling locomotive coal to minimize breakage.

Not included in the budget is work on the gas-turbine locomotive burning powdered coal. The coal industry is looking to this development as a means of continuing its position of the principal railroad fuel.

Annual S.A.E. Meeting Set for Next Week

NEARLY 70 technical papers covering virtually every phase of automotive engineering will be presented in more than 30 sessions at the annual meeting of the Society of Automotive Engineers in Detroit January 6-10.

Of particular interest to the petroleum industry will be sessions devoted to such subjects as diesel-engine research and new low-cost engines for economy automobiles.

Sessions of the meeting will be conducted in the Book-Cadillac Hotel.

Topics, times, and speakers of sessions of particular interest to petroleum industry representatives include:

WEDNESDAY, 10 A.M.

Diesel Engines.—"Must Diesel Engines Smoke?" P. H. Schweiter, Pennsylvania State College; "Analysis of Positive Supercharger Losses," R. J. S. Pigott, Gulf Research & Development Co. (To be presented by B. R. Walsh).

THURSDAY, 10 A.M.

Fuels and Lubricants, Symposium on Instrumentation.—"A Photoelectric Dynamometer Load Control," M. R. Clapp, Lubri-Zol Corp.; "Aircraft Engine Knock Indicators," J. S. Bogen, Universal Oil Products Corp.; "An Instrument for Piston-Temperature Measurement," A. C. Scholp, G. R. Furman, and P. A. Binda, The Texas Co.; "Automotive Detonation Indicators," J. W. Wheeler, Sperry Gyroscope Co., Inc.

THURSDAY, 2 P.M.

Fuels and Lubricants.—"Frigid-Air Starting and Operation," R. Wayne Goodale, Standard Oil Co. of California; "Engine Warm-Up With Present-Day Fuels and Engines," J. G. Moxey, Jr., Sun Oil Co.

FRIDAY, 10 A.M.

Diesel Engines.—"Method of Evaluating Effect of Sulfur on Engine Wear," C. C. Moore, Union Oil Co. of California; "Method of Measuring Cylinder Wear," C. S. Bruce and J. T. Duck, National Bureau of Standards.

FRIDAY, 2 P.M.

Diesel Engines.—(Outline of navy program for future diesel fuels). "Navy Experience With Diesel Fuels During the War," Capt. W. C. Latrobe, Bureau of Ships, Navy Department; "Navy Diesel Engine Research," W. J. Joachim, U.S. Naval Experiment Station.

Pipe Laid in 1888 Used In U. S.-Canada Line

SARNIA.—An additional 12,000 bbl. daily of crude oil is now being processed at Imperial Oil, Ltd.'s Sarnia, Ont., refinery, following the completion of an 84-mile, 8-in. pipe line from Waterville, Ohio, using 58-year-old reconditioned pipe.

The line, built in four 20-mile sections, skirts Detroit and goes north through Michigan to Sarnia. It was rushed to completion to meet Canada's current fuel shortage.

The increased flow brings a pipeline total of 42,000 bbl. daily to the Sarnia refinery. Some of this crude comes from South America via tanker to New Jersey and then by pipeline networks to Sarnia. The remainder comes from U. S. Mid-Continent and other fields.

As new pipe was not available for this line, Imperial officials point out that the operation was one of the most unusual associated with Canada's oil industry. A 110 miles of wrought iron pipe, laid in 1888 under Indiana farm lands, was purchased, lifted, reconditioned, and relaid. The reconditioned line now parallels and supplements lines already carrying oil to Sarnia from the United States.

The project was known as the "Oil for Christmas" operation. Cecil E. Carson, a director and general manager of Imperial Oil's refineries, pointed out that this pipe line was of vital importance to help meet Canada's steadily increasing demand for fuel oil.

Some of the difficulties which were met and overcome were described by J. R. Simpson, vice president and director of Transit & Storage Co. through whose facilities oil moves to Sarnia.

"We lifted pipe from the old location at the rate of 3½ miles per day, in fall weather," he said. "In Ohio and Michigan we dug the channel along the right-of-way, coated, wrapped and back-filled the pipe at the rate of about 1 mile a day. This included blasting a 750-ft. channel under the Maumee River.

"We had to remove pipe line from under railroads and buildings such as a grain elevator and meat packing plant. The reconditioned pipe had to be trucked 250 miles. The entire job took 83 days. The 500-odd men working on it knew Canada's need for oil, and I am sure this fact was at least partly responsible for a speedy job well done."

Cold Weather Boosts Demand in Burning-Oil Market

by Dahl M. Duff

COLD winter weather which had spread across most of the United States this week resulted in a heavy influx of new orders for burning oils, and in the Mid-Continent area, some marketing officials anticipated another general price increase for this group of products in the near future.

The weather intensified demand in an already strong burning-oil market. The entire range of kerosene and distillates was reported moving at and above full posted quotations. Range oil was bringing a minimum of 5¼ cents; No. 1, 5 cents; and No. 2, 4⅞ cents.

The slump in market movement which some sales officials predicted would follow the heavy shipments made in late December prior to higher freight rates, had failed to materialize early this week. It was pointed out the subsiding of the rush shipments coincided with the new flood of burning oil orders.

Highway traveling over the holidays had some favorable effect on gasoline movement which has been holding up exceptionally well in a season of slack demand. Pipe-line gasoline was said to be in particular demand.

Refiners were accepting January burning-oil orders on a "market-date-of-shipment basis." Some larger refiners, pressed to meet orders from their own production, were reported actively buying burning oils.

In New York, residual was reported tight and was expected to continue in demand the remainder of the winter. Stocks of No. 5 on the East Coast had improved to the point where a further price increase was rumored. No. 2 and kerosene were moving actively in New York, and stocks were reported to be ample.

Demand for natural gasoline continued strong with prices firm at 5 cents Oklahoma and 4½ North Texas. An earlier ¼ cent rise in the North Texas price was reported to have curtailed movement of some Texas Panhandle natural gasoline into Group 3 territory.

A.A.P.G. to Hold Meeting

WICHITA.—Descriptions of unusual oil fields, together with technical papers on the future possibilities of the Mid-Continent region, will set the theme for a regional meeting of the American Association of Petroleum Geologists, sponsored by the Kansas Geological Society, here January 16 and 17.

The papers will include reports on the Anadarko basin, Las Animas arch, subdivisions of the Arbuckle dolomite in western Kansas, and the structural framework of the Mid-Continent region as a whole.

Oil fields to be discussed will include Rangely, Colorado; West Edmond and Antioch, Oklahoma; Kraft-Prusa, Hugoton gas field, Marine pool, Kansas; Deep River pool and Adams pool, Michigan, and others. Headquarters of the meeting will be in the Broadview Hotel.

Speakers on future prospects of the Mid-Continent and their subjects are:

"Structural Framework of the Mid-Continent Region," Ira H. Cram, Pure Oil Co., Chicago; "Anadarko Basin and Its Oil Possibilities," Robert R. Wheeler, Eason Oil Co., Enid, Okla.; "Oil Possibilities of the Las Animas Arch," Harry W. Oborne, Colorado Springs, Colo.; "Subdivisions of the Arbuckle Dolomite in Western Kansas," Joseph R. Clair, Skelly Oil Co., Wichita, Kans.; "Role of Geophysics in Future Development of Mid-Continent," Gerald H. Westby, Seismograph Service Co., Tulsa; "Radioactivity Well Logging," V. J. Mercier, Lane-Wells Co., Wichita; and "Detailed Core of Hunton Limestone in West Edmond Field," J. T. Richards, Gulf Oil Corp., Oklahoma City.

Speakers and their subjects on unusual oil fields are:

"Unusual Oil Fields of the Rocky Mountain Province," C. E. Dobbin, U. S. Geological Survey, Denver; "Norman Wells Oil Field, Canada," J. S. Stewart, Geological Survey of Canada, Ottawa; "Deep River Pool, Michigan," K. K. Landes, University of Michigan; "Adams Pool, Michigan," Rex P. Grant, Michigan Department of Conservation, Lansing; "Pools of Geneseo Trend, Kansas," Stuart K. Clark, Continental Oil Co., Ponca City, Okla.; "Marine Pool, Madison County," H. A. Lowenstam, Illinois State Geological Survey, Urbana.

"Hugoton Gas Field, Kansas," L. C. Morgan, Wichita, Kans., and others; "Rangely Oil Field," J. M. Kirby, California Co., Denver, and others; "Antioch Pool, Garvin County," Lon B. Turk, Oklahoma City; "West Edmond Field, Oklahoma," Robert M. Swesnik, Gulf Oil Corp., Oklahoma City; "Kraft-Prusa Field, Kansas," R. F. Walters, Gulf Oil Corp., Tulsa; "Moren-Kisinger Pool, North Central Texas," M. G. Cheney, Coleman, Tex.; "Geophysical Case History of Guthrie Field, Oklahoma," B. G. Swan and W. Baxter Boyd, Continental Oil Co., Ponca City, Okla.

DEATHS

Homer F. Wilcox, 69, discoverer of the Wilcox sand and founder of the Wilcox Oil & Gas Co., now the Wilcox Oil Co., died December 27 at his home in Tulsa. He retired as president of his company and sold its controlling interests 4 years ago. Wilcox drilled his first well in 1914, punching through the Mississippi lime and penetrating the sand which later bore his name. He organized his company in 1918, and it was credited with opening the Poor Farm and the Sac and Fox pools in Oklahoma, Pampa pool in Texas, Fairport pool in Kansas, and many smaller fields in Oklahoma and Texas.

Andrew J. McClatchey, 88, retired assistant secretary and director of New York Transit Co. who joined the old Standard Oil Co. in 1877, died recently at his home in Binghamton, N. Y.

Morris E. Peteet, 65, independent oil operator, died December 24 at his home in Tulsa.

Hodge M. Falkenhagen, 44, Houston geologist, died December 22 in a Houston hospital following an automobile accident.

Robert C. Hull, 75, Gulf Oil Co. accountant for 21 years until his retirement 8 years ago, died December 22 at his home in Tulsa. During the war he served as chairman of the War Industries Board in Tulsa.

David Wallace, 63, connected for many years with Western Supply Co., died December 26 at his home in Tulsa.

Harold R. Hawkey, 54, former manager of Wolf's Head Oil Refining Co., Inc., refinery at Reno, Pa., died December 20 at his home in Tidioute, Pa.

John H. Wilcox, 55, field man in Latin America for Standard Oil Co. (N. J.), died December 22 at his home in Houston.

Clarence L. Duffield, independent oil operator in Oklahoma and earlier in Pennsylvania, died December 29 at his home in Tulsa.

L. O. Gleason, 59, drilling contractor and independent operator in South Texas, died recently at his home in San Antonio.

Charles G. Thornton, 54, independent Oklahoma operator, died December 30 at his home in Tulsa.

LARGEST UNIT OF KIND IN WORLD

by Randall Maass and B. E. Lauterbach**

WITH the diesel engine, the household burner, and the light-oil cracking units all competing for the intermediate or gas-oil fractions, the general trend in refining is toward a more extensive cracking of the residuum fraction. It has been estimated† that this trend, in the next 10 or 20 years, will reduce the percentage residuum from the present 26 per cent to some 10 per cent. It is not expected that this cracking of heavier stock will so much replace light-oil cracking as that it will provide the requisite charge stock.

General Petroleum Corp. has contributed to this trend by installing a 15,000-bbl.-per-day delayed coking unit to process 300-700 S.S.F./122° F. straightrun residuum. The gas oil thereby obtained will serve to supply part of the feed stock to the four T.C.C. units. The coking unit was designed, engineered, and constructed by M. W. Kellogg Co., and incidentally is the largest unit of its kind in the world. Coking operations were started July 26, 1946, culminating a successful and relatively simple startup operation.

General Process

The cracking portion of the coking unit is divided into two sections each with its own furnace and pair of coke drums to be used alternately. The cracked products from the two cracking sections enter a common bubble tower for fractionation into an overhead product of gasoline and lighter, three gas-oil draw products, and a bottoms recycle product. The straightrun residuum charge, or reduced-crude charge as it is also called, is introduced into the bubble tower for further fractionation with the bulk of it appearing in the bottoms for furnace charge. Three steam strippers for the sidedraw streams and a gasoline debutanizer complete the fractionation equipment.

Furnaces

Two duplicate furnaces have been provided, one for each pair of drums. The distinguishing and highly desirable feature of a delayed coking unit is the delaying of the coking until the charge reaches the soaking chamber (coke drum). To accomplish this the furnaces are designed for a low-residence time and consequently a high rate of heat pickup. Because of the high heat level (600° F.) of the furnace charge, the oil tubes were restricted to the radiant section and the hotter portion of the convection section. Heat economy is realized through the use of water tubes for steam production in the colder portion of the convection bank.

In general each furnace has four separate coils which join outside the firebox into a common transfer line. Alloy tubes of 9 chrome—1.5 moly are used in the radiant section and to shield the convection bank. The remaining tubes in the convection bank are 5 chrome—0.5 moly. Heat is supplied by 16 Zink combination oil and gas burners located in the end of the firebox.

Coke Drums

A continuity of operation is maintained through the use of a pair of coke drums for each furnace, one drum being in coking service while the other is being decoked. Each drum is 17 ft. in diameter and 80 ft. in height with 61 ft. of straight section. For protection against corrosion the vessels are lined with a 7/64-in. thickness of Type 405 stainless steel, the lining being resistance welded to the shell. In addition the upper half of the shell is ⅞ in. thick and the bottom half 1 in. thick. To subject a vessel of this size to the changing temperatures of blocked operations requires, of course, that it be fully stress relieved and its welds X-rayed.

Alloy steels were also used in the principal piping to and from the coke drums. The transfer lines were fabricated from 9 chrome—1 moly pipe and the vapor lines from the drums to the bubble tower from 5 chrome—0.5 moly. Portions of the drum condensate lines, the side vapor lines, and the bypass lines are also of alloy steel.

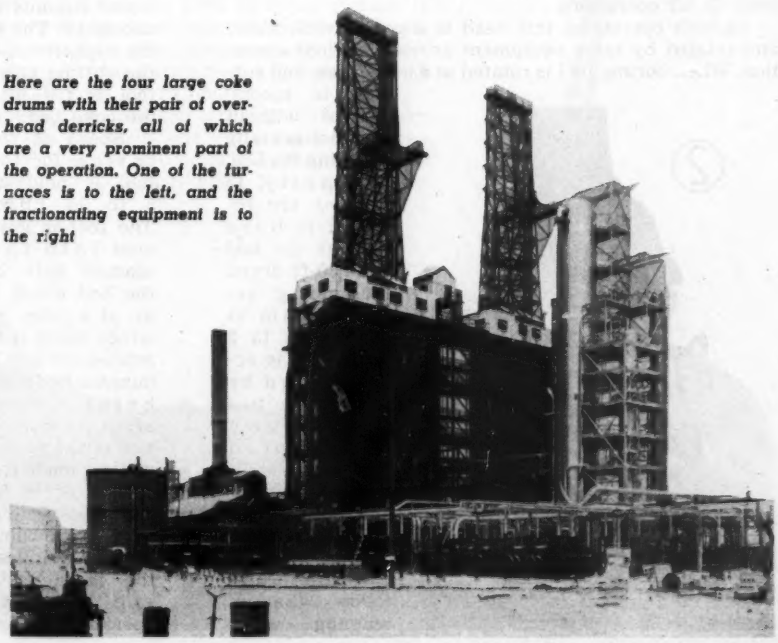
Bubble Tower

The 100-ft. high bubble tower is 11 ft. in diameter in its upper section and in its bottom section is enlarged to 12 ft. 6 in. to accommodate the increased downflow occasioned by the introduction of the intermediate reflux and the reduced crude feed. Fifteen cast-iron bubble trays are used in the upper section and in the lower section 10 Type 405 stainless-steel bubble trays with 8 cast-iron baffle trays below them in the potential coking region. The shell thickness varies from 9/16 in. to 15/16 in. and is protected throughout by a 7/64-in. Type 405 stainless-steel strip-welded lining.

To reduce construction costs the three sidedraw steam strippers are contained in one 4 ft. 6 in. by 56 ft. shell appropriately divided into three six-bubble-tray sections. The avail-

(Continued on page 68)

(See pictorial spread next two pages)

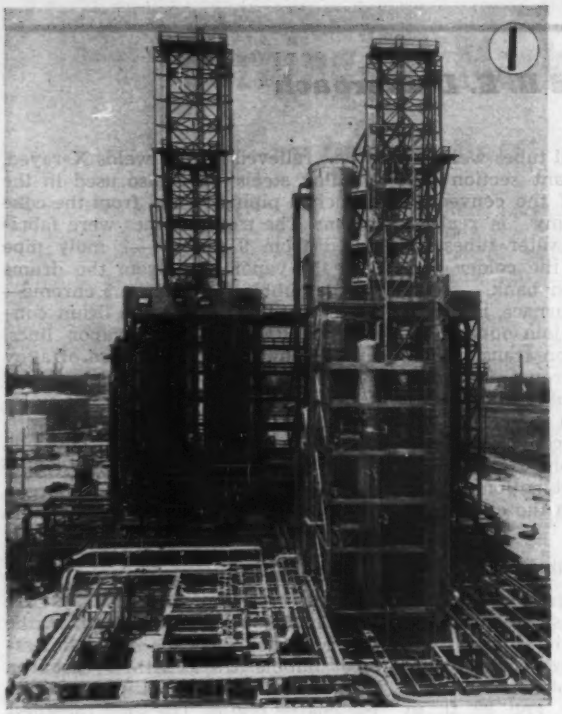


Here are the four large coke drums with their pair of overhead derricks, all of which are a very prominent part of the operation. One of the furnaces is to the left, and the fractionating equipment is to the right

*General Petroleum Corp.

†Hulse, S. H., The Oil and Gas Journal, June 15, 1946, p. 93.

PICTURE DETAILS OF GENERAL PETROLEUM'S



1 Seen in the foreground of General Petroleum's new delayed-coking plant are the unit's bubble tower, stripper, and stabilizer tower vessels. To the left are two of the coke drums and directly back of the fractionating vessels is the other pair. Each pair of drums is provided with separately fired heaters. Coils for these heaters are divided into separate sections per heater, each of which joins into a single transfer line for each pair of drums outside of the firebox. Since only the radiant and hotter portions of the convection sections of each furnace are used, steam is generated in the lower-temperature regions of the convection section. Various grades of alloy tubes are used in the oil section.

Some 75 per cent of the plant's steam requirements are taken care of by the heat pickup in the heaters. Outlet from both steam generators enters a common steam drum, with a pump recirculating service back to the steam coils. Makeup water is fed into the system through the common steam drum which is equipped with a liquid-level controller for admitting treated water, demanded to maintain a constant level.

The structures located on top of the coke drums are a part of the plant's coke-removal equipment. Serving to raise and lower the coke-drilling equipment as desired, these derrick structures are 100 ft. higher than the coke drums which are 80 ft. in over-all height. The drill stem is in one piece and long enough to reach the length of the drum. Its upper end is equipped with a swivel head and its lower end is provided with suitable couplings for attaching the different cutting tools. Water for the jets is piped to the floor of the derrick where suitable block valves are installed. Two volute centrifugal units supply the water for the three coke-removing operations.

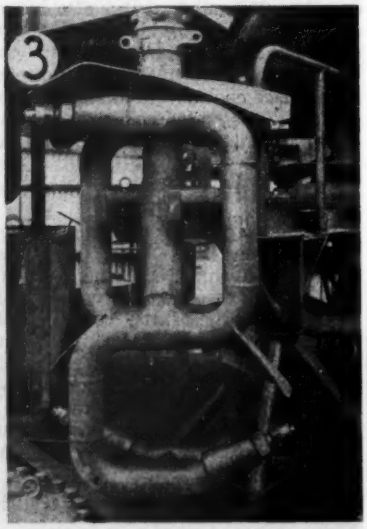
2 The rotating jet head shown here is used for the first operation in removing coke from the drums. For reaming, the head is equipped with larger nozzles and the one which points downward is not used. When boring, the four nozzles on the sides of the head are ⅜ in. and the bottom nozzle ½ in. Streams from the side jets are approximately 45° from vertical in both operations. Two ⅛-in. nozzles are placed at the top of the head so their streams keep the head free from coke fines in all operations.

In both operations this head is supplied with water and rotated by same equipment as used in final operation. When boring, tool is rotated at 8 to 10 r.p.m. and cutting is accomplished without the tool actually touching the bed. Normally, 15 minutes are required to bore through the bed in an 80-ft. drum. Reaming requires from 45 minutes to 2 hours and is accomplished by running the tool up and down through bored hole until it is about 6 ft. in diameter. The cutting or third operation for decoking the drums follows that of reaming.

3 Following the reaming operation this hydraulic cutting tool is lowered into the hole previously made through the coke bed. The two nozzles at the upper end of the tool direct horizontal streams through 7/16-in. tips whereas the two at the lower end are set at an angle and are equipped with ⅝-in. tips.

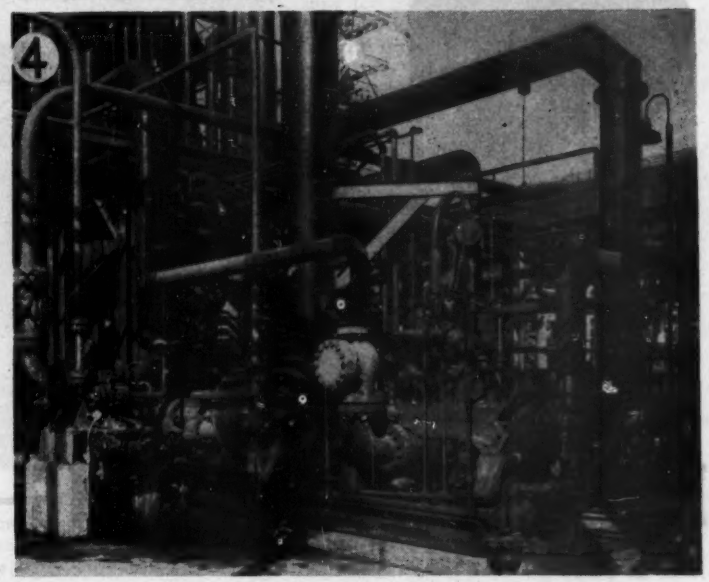
At 8½ ft. from the axis of the tool the upper and lower streams intersect. All nozzles are replaceable as necessary. The cutting rate is controlled to balance with the capacity of the coke-water slurry pump. In general, the cutting rate is regulated by the speed at which the tool is fed into the coke bed.

Speed of rotation for the tool is held at 5 to 10 r.p.m. The tool is lowered into the reamed hole in the bed about 8 in. at a time, at which depth it is rotated for 2 to 3 minutes before being lowered again. An inspection of the vessel walls is made for each 5 or 10 ft. This inspection is to insure complete cleaning of the vessel side walls during the operation.



NEW HYDRAULIC DECOKING FACILITIES

4 Water for the jets of the different cutting tools is supplied to the derrick operating floor by two five-stage, steam-turbine-driven centrifugal pumps. Each pump is provided with electrically powered block valves. Located in the pump discharge lines, these valves operate to prevent injury to the pumping equipment when shutoffs are made at the derrick floor. The general scheme of this valve's operation is such that when the main block valve begins to close, a bypass valve begins to open to discharge water back into the suction tank. Driven with 1,450-hp. turbines at 4,000 r.p.m., each pump delivers 1,100 g.p.m. at 1,500 psi. The two units when in parallel deliver 1,600 g.p.m. at 1,500 psi. The turbines for these pumps are operated with 100° superheat, 165 psi. steam. A barometric condenser allows the turbines to exhaust at 23-in. mercury.



5 Coke falls from drums into a mobile crusher which is positioned under the bottom cutlet during decoking operations. After breaking the coke into maximum dimensions of 5 in., the crusher discharges into a sluice which leads to a slurry pump.

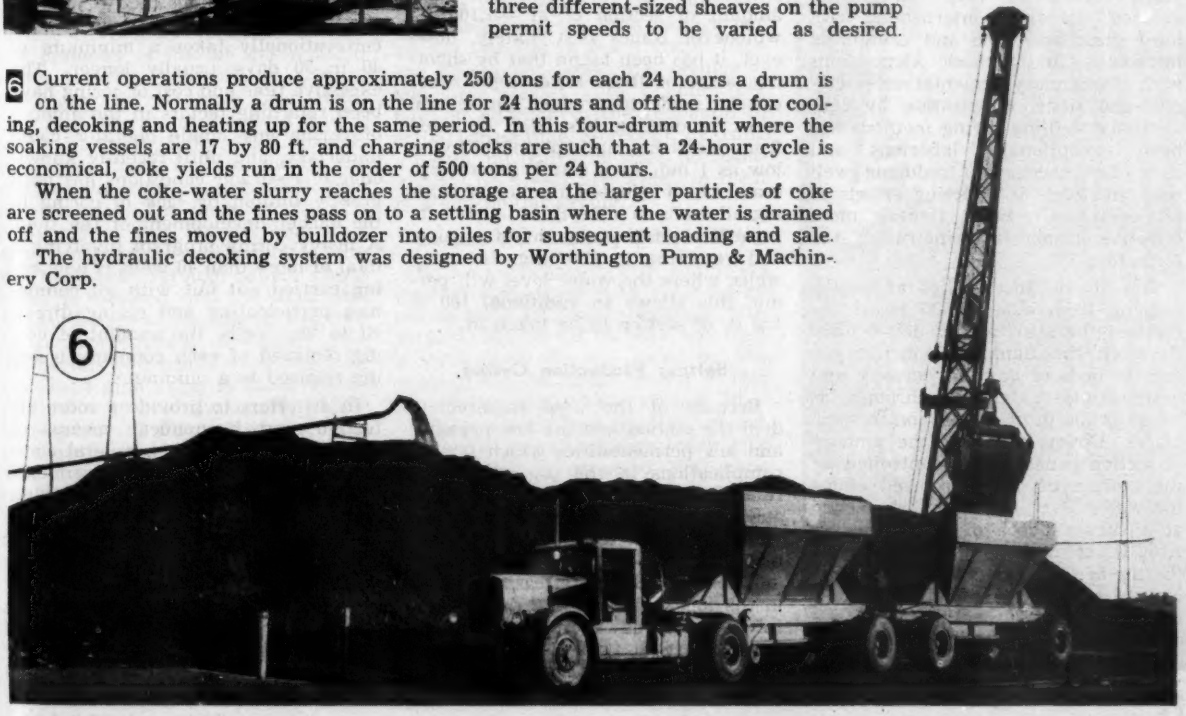
The two rolls which grind the coke to a size suitable for handling by the slurry pump are toothed and spaced 5 in. apart. Each roll is 2 ft. in diameter and 5 ft. long. A 40-hp. motor drives the crusher.

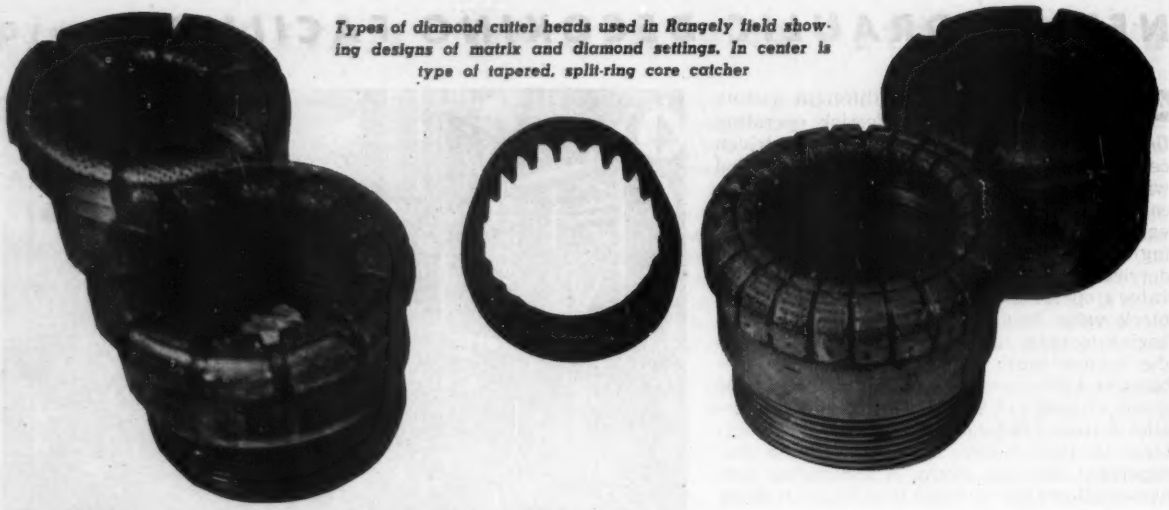
Coke-water slurry passes from the sluice into a coke sump where it is picked by an Allen-Sherman-Hoff slurry pump which discharges through 2,500 ft. of 12-in. pipe line to the storage area. This pump is supplied with a clean water stream which enters its case and seals the impeller. Grit flushed away from the close-clearance areas between impeller shrouds, shaft, suction eye, and rubber linings. A variable-speed device consisting of an adjustable sheave on the motor drive and three different-sized sheaves on the pump permit speeds to be varied as desired.

6 Current operations produce approximately 250 tons for each 24 hours a drum is on the line. Normally a drum is on the line for 24 hours and off the line for cooling, decoking and heating up for the same period. In this four-drum unit where the soaking vessels are 17 by 80 ft. and charging stocks are such that a 24-hour cycle is economical, coke yields run in the order of 500 tons per 24 hours.

When the coke-water slurry reaches the storage area the larger particles of coke are screened out and the fines pass on to a settling basin where the water is drained off and the fines moved by bulldozer into piles for subsequent loading and sale.

The hydraulic decoking system was designed by Worthington Pump & Machinery Corp.





Types of diamond cutter heads used in Rangely field showing designs of matrix and diamond settings. In center is type of tapered, split-ring core catcher

DIAMOND-BIT CORING—

in the Rangely, Colorado Field

by Neil Williams

A MAJOR factor in the high well costs that have characterized development in the Rangely field of northwestern Colorado has been the excessive time involved in penetrating the producing formation (Weber sandstone). The latter formation is a thick section of very hard, fine-grained, tight sand interbedded with hard shale and lime and containing micaceous and arkosic depositions with a secondary cementation of calcite and silica. Penetration by conventional drilling coring methods has been exceptionally laborious and slow. The urgency of reducing well time and costs is directing efforts of all operators toward finding more effective means of penetrating the formation.

Top of the section lies at depths ranging from about 5,500 ft. at the crest of the structure to below 6,550 ft. down the flanks. Production occurs in beds of varying porosity and permeability extending through as much as 750 ft. of the section in some places. Down structure, the amount of section penetrated is controlled by the margin of safety allowed above the water level, currently established at a subsea depth of approximately 1,160 ft., or about 850 to 900 ft. below the top of the section at its crest. The general rule is to limit all wells to a maximum subsea depth of 1,100 ft., or about 60 ft. above the water level.

Below the first 550 to 600 ft. of the section the sands until recently have been considered too tight to produce. Permeabilities in these lower beds usually do not exceed 5 md. and often run less than 1 md. Consequently, most operators have not considered it worth while to attempt to take in more than the first 550 to 600 ft., the practice being to stop wells with that amount of section or at —1,100 ft., whichever comes first. Lately, however, it has been found that by shooting, some of these lower tight zones can be made to produce. In several cases production has been obtained from sands having a permeability as low as 1 md. As a result, several operators have adopted a policy of drilling all wells to a depth of —1,100 ft., regardless of the amount of section, and resorting to shooting. In many wells, where the water level will permit, this allows an additional 100 to 150 ft. of section to be taken in.

Setting Production Casing

Because of the time required to drill the section and the low pressure and low permeabilities which impose complications in the use of drilling fluids to prevent "logging" the sand, and also because of the desirability in many instances of shooting the formation, it has been customary to set and cement production casing strings in the top before drilling the section. In all cases, however, the casing is set at least 50 ft. below the gas-oil contact (320 ft. subsea depth). The free gas zone is relatively small both in areal extent (less than section) and in section thickness (maximum 75 to 100 ft.), and in most wells the top of section is below the contact point. Seven-inch (o.d.) casing is run and the section drilled with 6⅛-in. hole.

Drilling 500 to 550 ft. of section by conventional methods requires on the average from 20 to 25 days. Coring conventionally takes a minimum of 40 to 50 days, usually longer. The excessive time and cost of coring have been retarding factors in the amount of coring any single operator could undertake, and until recently knowledge of reservoir conditions has been greatly limited by lack of coring in the earlier development of the field. A heavy coring program involving a total of more than 40 wells is now being carried out but with all companies participating and coring directed to key wells, the amount of coring required of each company is being reduced to a minimum.

In an effort to provide a more effective and economical means of penetrating the section, several companies lately have been experimenting with the use of diamond coring bits. In the seven wells in the field in which such bits have been tried either for all or parts of the section, favorable results in greatly reduced coring time and costs have been obtained. The applications have been for coring but in them not only have full-sized holes been cored but the coring has been done in much less

Core, cut with diamond bit head using 50-ft. barrel, is laid out in three lengths on pipe rack. Broken into pieces for sampling, representative samples are being collected by C. T. Freestone and R. Richardson, Core Laboratories, Inc., field engineers, for analysis. Recovery from barrel was 100 per cent

time than required for conventional drilling. As compared with the average time of 20 to 25 days for drilling and 40 to 50 days minimum for coring a 550-ft. section, the average time for comparable footage with the diamond-core bits has run from 10 to 12 days. Approximately 100 per cent core recoveries have been obtained. Comparative data of conventional coring and drilling with that of diamond bit coring are presented in Table 1.

In these runs, 6⅛-in. (o.d.) by 3¾-in. (i.d.) by 2¾-in. long bit coreheads have been used. In one well in which reverse circulation was tried the inside diameter of the bit was reduced to 2⅜ in. With these bits, 5 11/16-in. (o.d.) core barrels have been used. The first barrel in the field had a length of 25 ft. Since, 30-ft. barrels have been tried, and in one of the most recent wells cored a 50-ft. barrel was used. The barrel actually is composed of two barrels, consisting of the outer barrel which rotates with the head and through which circulation is directed, and the inner stationary barrel which collects the core. In the conventional circulation jobs, the barrels and heads were run with 3-in. drill pipe using 90 ft. of 4¾-in. drill collar to hold the barrel straight (a requisite of diamond coring) and concentrate the weight. To prevent whipping of the pipe which might result from the required higher rotating speeds, one company ran a stabilizer on the top part of the barrel. This had a 30-ft.-long body with three 6⅛-in. (o.d.) spiral hard-faced ribs holding against the walls of the hole. Stabilizer ends were equipped with regular A.P.I. tool-joint box and pin. For the reverse circulation attempt 3-in. drill pipe was replaced with 2½-in. tubing.

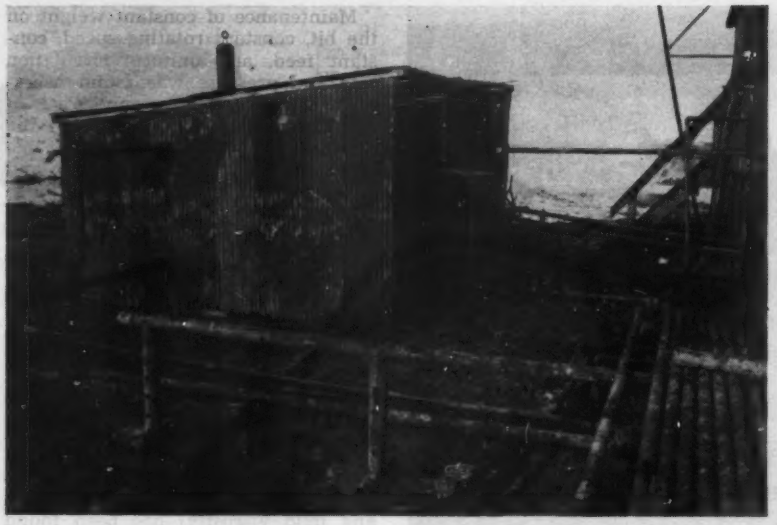
Actual cutting time (exclusive of trips, etc.) with diamond bits has run from 8 to 12 minutes per foot as compared with an average of more than 45 minutes per foot for conventional coring. Conventional coring time ranges from around 20 minutes up to as much as 270 minutes per foot. Cuts have averaged from 150 to 175 ft. per head against 6 to 8 ft. for conventional-type heads. In one case, the record, a total of 544 ft. was cut with a single head. With 25, 30, and 50-ft. cores being cut, the high footage per bit has resulted in fewer round trips and consequent substantial savings in trip time (about 6 to 8 hours per trip) in addition to the reduction in actual coring time. Moreover, by using a 6⅛-in. bit (full hole size), no reaming has been required which in itself is a substantial saving.

Results Not Entirely Satisfactory

So far experiments with employing reverse circulation with diamond-bit coring have not proved entirely satisfactory. Attempted in only one well, a total of 80 ft. was cored by this method but the cores tended to clog up in the catcher after cutting 10 to 12 ft. and could not be pumped out. When reverse-circulation coring is perfected it is expected that cores will be pumped to the surface as cut and the number of round trips further reduced, and possibly that the need of trips will be eliminated if one bit can core the entire section. Reverse circulation also is expected to make for faster and better coring by more effective removal of the cuttings from the bit.

Maintenance of constant weight on the bit, constant rotating speed, constant feed, and uniform circulation rate and pressure was found necessary for most effective application of diamond-bit coring. Although the weight on the bit was varied some with the formation hardness and other factors, best results have been obtained with weights of 3,000 to 6,000 lb. and generally within the range of 3,000 to 4,000 lb. Close control of weight has necessitated use of a sensitive weight indicator and constant watch by the drillers. With this weight most effective cutting was done with rotation speeds within the range of 125 to 150 r.p.m. One company holds speed to a maximum of 130 r.p.m. Constant fluid passage of about 100 g.p.m. (with oil-base mud) with pump pressure of 300 to 400 psi. (depending on drill pipe size, depth, and mud viscosity) has been found most suitable. Excessive circulation rate and pressure have caused fluid erosion on the bit matrix and undue wear on the inner barrel and core catcher. Precautions must be taken to keep the hole straight, accurately to gage, and free of any junk. To insure starting with accurate gage the first 2 or 3 ft. of hole usually is made with a new formation bit. Accurate gage helps to keep holes straight. It is necessary also to hold the core face flat against the bottom of the hole. Practice has been to start rota-

Extracting core cut with diamond cutter head. Twenty-five-foot, 30-ft. and 50-ft. barrels are being used



Mud-pump suction and discharge line manifolding in closed circulating system used by Phillips Petroleum Co. for drilling with crude oil in Rangely field. Hookup provides for either conventional or reverse circulation. Line at lower left is suction line to mud pumps (housed) from circulating oil tanks. Flow control valves from pump discharge are barely visible on ground at front of housing

TABLE I—COMPARATIVE CORE RECORD

	Diamond head*	Conventional barrel and bits†
Weber section cored (ft.)	485	433
Core recovery (ft.)	484.36	398.08
Core recovery (%)	99.89	91.93
Number cores cut	22	57
Av. cut per core (ft.)	23.81	7.59
Total cutting time (hr.)	98.84	614.1
Total reaming time (hr.)	0	166.62
Total trip time (hr.)	143.9	675
Core time per foot (minutes)	11.97	110.31
Number core bits	4	57
Avg. cut per head (ft.)	115.3	7.59

*Average of three wells—6⅛-in. bit and 3¾-in. core. †Average of two wells.

tion before touching bottom, and then set down, rotating slowly, until the bit starts to drill. Use of the three drill collars to concentrate the weight and prevent whipping of the pipe has been an important factor in keeping the bit faces flat and the holes straight and true to gage.

Pipe wipers have been employed to prevent small pieces of junk from falling into the hole, and usually a junk sub or catcher has been run with the bit to clean the hole of foreign material. The hazard of junk lies not only in the danger of throwing the hole off and stopping coring but also in possible damage to the bit, which because of the diamonds, is of high physical value. Extreme care had to be exerted both while coring and on trips to prevent any twistoffs or sticking of the pipe. In view of the 5 11/16-in. barrel in 6⅛-in. hole, it would not be possible to run an overshot for fishing the barrel, and if the barrel were full of core an inside spear might be ineffective. The only alternative would be to mill up the barrel and bit head, or sidetrack the fish. For this reason, also, close watch of the hole had to be maintained to keep it in good condition at all times.

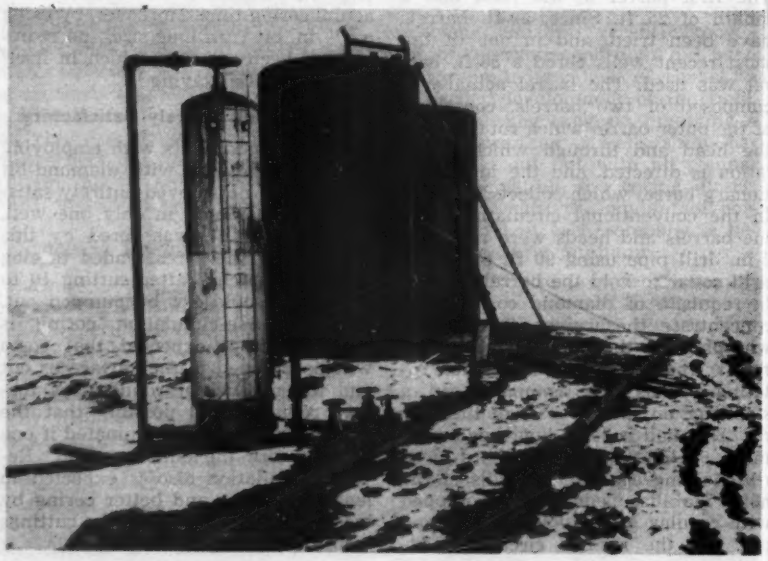
Any increased speed with which the producing section can be penetrated also will serve to reduce the time that is necessary to keep drilling fluid on the face of the sand. Particularly if water-mixed muds are used, this will lessen the chance of "logging" the low-pressure and tight sands by infiltration, and thus result in more effective completions and better productivity.

Wells in which diamond bits have been used so far for coring the producing section include four by Stanolind Oil & Gas Co., two by The Texas Co., and one by California Co. These do not include the one well in which Stanolind has experimented with the use of diamond-head core barrel with reverse circulation. It is interesting to note that in the well cored by California Co. one 25-ft. cut was made at the rate of 2.8 minutes per foot, a record time for the field.

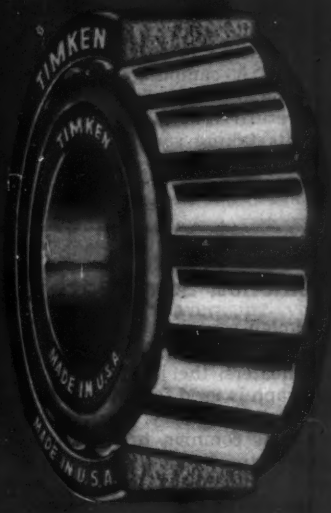
Utilization of crude oil as the drilling fluid is another practice lately being tried out in a further effort to develop more economical and effective means of drilling or coring the producing section in the Rangely field. In this, the lead is being taken by Phillips Petroleum Co. which has used crude oil for this purpose in three of its most recent wells. Although the procedure has been followed in various other fields in the past, notably in the Oklahoma City field, its application at Rangely is new.

During the past year, oil-base muds have been universally adopted as the medium for drilling and coring the producing section at Rangely, replacing water-mixed muds as a means of minimizing the danger of contaminating and logging the tight sands by water infiltration. Effective results have been realized in the use of oil-base muds although costs are somewhat higher. Use of crude oil, by reason of its availability in the field, offers prospects of some savings along this line, although its use generally has been objectionable because of its

Closed circulating system hookup used by Phillips for drilling with crude oil. Well returns are circulated through separator (foreground) to eliminate free gas. First tank is used to settle cuttings and foreign material. Clean oil passes to second tank providing suction for mud pumps



On the Job with THE IDECO STREAMLINED ROTARY



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TIMKEN
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increased fire hazards, and special safety precautions that must be taken.

Both Methods Being Tried

Both conventional and reverse-circulation methods are being tried in an effort to determine the most effective procedure, and well hookups are provided so that circulation can be directed either to the drill pipe and out the annulus in conventional manner, or to the annulus and out the drill pipe in reverse circulation to the settling tank. The circulating systems are entirely closed. Two 315-bbl. 18½-ft.-high closed steel tanks are provided, one for settling of cuttings and foreign material, and the other for pump suction. The settling tank is equipped with a 4-in. riser to within 4 ft. of the top through which the clean oil is passed to the second, or suction tank. A sampling trap (see accompanying picture) installed on the fluid return line to the settling tank permits taking samples of cuttings at any time.

Sample trap on oil-return line from well to settling tank in closed circulating system for drilling with crude oil on Phillips well

Plant Practices

Oil Cushioned Screw Jack

EVEN though especially devised for use in positioning headers on vertical tube heaters, the jack shown in the photograph is used for many other jobs around the refinery. Built from odds and ends common to most machine shops, the jack represents a very small investment. Ordinary industrial type swiveled castors permit the device to be moved easily from place to place.

Various shaped heads are available for the jack according to the job at hand such as placing headers, valves, flanges, and sections of pipe into position. Extra-heavy 2½-in. pipe is used to make the cylinder which is bored to give a snug running fit on the jack shaft. The plunger or jack shaft is oil cushioned and has a lift of from 18 to 20 in. The 1½-in. length of pipe attached to the lower end of the cylinder serves as a reservoir for the cushion oil; a small hole in the pipe cap on the reservoir permits air to enter or escape during raising or lowering operations. Gearing consists of a set of 3-to-1 ratio spur gears and a 2-in. diameter gear which meshes with the rack teeth of the jack shaft. A rachet having a change lever about 6 in. long permits the feed to be adjusted as desired. After fabrication the assembly was machined to insure alignment.

Portable Scales for Weighing Fire Extinguishers

THE portable scales-tripod arrangement shown in the photograph has proved to be a handy tool for simplifying the weighing of carbon dioxide fire extinguishers and similar equipment which is unwieldy to bring to a fixed scales installation. It was developed by the Canton Refining Division of Central Pipe Line Co., at Canton, Ohio, reported by L. E. McArthur, in charge of Safety and Inspection.

The tripod is made of a round steel plate 10 in. in diameter by ¼ in. thick, to which legs of 1-in. pipe are hinged, with stops to hold them in the correct position. The scale is suspended from this hook on the short arm of a handle or lever, which is hinged to the under side of the plate at a point near its periphery in such manner that the lever will raise or lower the scales some 8 in. or 9 in. This lever is held down, when the scale is raised, by a ¾-in. rod which is eye-hinged on one leg and is slipped inside the other leg and held by a hook. To weigh a cylinder or extinguisher the tripod is transported to the location, fulcrum scale is attached to the lever, two pieces of chain are placed around the extinguisher, and carriage if one is used, the net weight of which has been determined earlier, the lever is lowered to raise the extinguisher off the ground, the item is weighed in the customary manner.

Displacement and Invasion For Injection Wells

OIL PRODUCTION by water

PART 9 OF A SERIES

*by Park J. Jones**

PRODUCTION of oil by injected water is similar to oil production by encroaching water. Dry-oil reserve is proportional to the product of displacement and breakthrough invasion factors. These factors plus interference between wells are considered here as a background for the next article in which injection-well requirements and water requirements will be discussed.

Interference Between Wells

THE optimum locations for water-injection wells usually are along a water contact. However, the productivity of some reservoirs may be small and such reservoirs may have to be split up into several producing units. In such cases, the optimum location of injection wells may be along one, or more, updip contours as well as along a water contact.

In most cases, injection wells constitute a one-row system. The interference here used for injection wells is shown in Fig. 9-1. The injection capacity of one well is taken at 100 per cent aside from plugging. The injection capacity of five wells, two on each side of the first well, is taken at 64 per cent of that for the first well. The injection capacity of N wells on a row is taken at $0.64NQ_w$ where Q_w is the injection capacity for one average well on the row.

The B and M Contours

The position of B and M contours for radial advancement of injected water is illustrated in Fig. 9-2. The water injected into a well located at the left end advances in all directions from the well. Fig. 9-2 is a section along any one radius. The vertical axis on the left shows the oil displaced by water in per cent of in-place oil for a fluid factor equal to four. The vertical axis on the right is for 1,050 bbl. per acre-foot of in-place oil. The breakthrough recovery is (28 — F) or 250 bbl. per acre-foot. The maximum recovery is (80 — F) or 800 bbl. per acre-foot.

The oil-water interface advances from left to right. At the time the oil-water interface is 100 ft. from the injection well, practically all of the recoverable oil has been displaced from the immediate vicinity of the injection well. At the time the oil-water interface is 500 ft. from the injection well, all the recoverable oil has been displaced within a radius of about 118 ft. A plan view for the 500-ft. advancement is shown by the B_5 and M_5 contours in Fig. 9-3.

At the time the oil-water interface is at 1,000 ft. from the injection well, all the recoverable oil has been displaced within a radius of about 414 ft. A plan view for the 1,000-ft. advancement is shown by the B_{10} and M_{10} contours in Fig. 9-3.

The position of an M contour relative to its B contour for injection wells having radial advancement of water is given by

$$M = (1{,}000{,}000 + B^2)^{1/2} - 1{,}000 \quad (1)$$

where B and M are the average radial distances from an injection well to the breakthrough and maximum recovery contours respectively. The distance B-M along an average radius is shown by the B-M curve in Fig. 9-4. The data are for radial divergence of productive area and no variation of pay thickness.

Displacement Factor

The oil displaced from the region enclosed by an M contour surrounding an injection well is 100 per cent of the recoverable oil. The oil displaced from the region between a given set of B-M contours varies with distance from an injection well. The displacement factor m is obtained by averaging volumetrically the oil recoveries from the individual sections within a B-M region. It can be verified that

$$m = 80 - F - 52\left[\frac{2B + M}{3(B + M)}\right] \quad (2)$$

where m is in per cent of in-place oil. Equation 2 when divided by (80 — F) gives the displacement factor in terms of recoverable oil. The m curves in Fig. 9-4 are in terms of recoverable oil. Water has to advance about 1,000 ft. before the oil displaced from a B-M region is about 60 per cent of

*Production consultant, Houston.

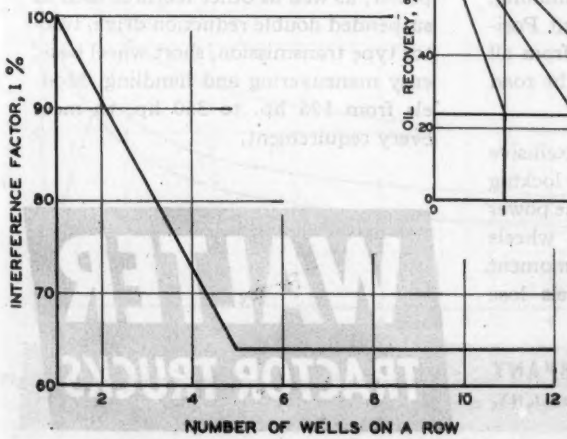

Fig. 9-1—(Left) Interference factor for a one-row system of injection wells

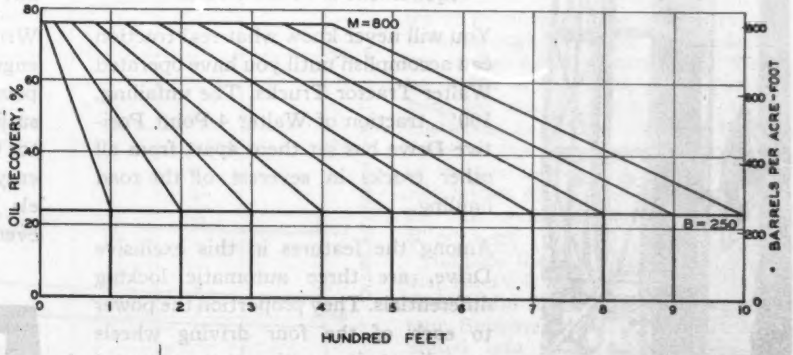

Fig. 9-2—(Above) Sectional view of B and M contours for radial advancement of injected water; oil recovery from invaded region in per cent of in-place oil and a fluid factor equal to four; recovery in barrels per acre-foot relative to 1,050 bbl. per acre-foot in place

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the recoverable oil provided the fluid factor is not too high.

The displacement factor for the entire region invaded by water varies with the ratio of the acre-feet of pay within an M contour to the acre-feet between M and its B contour. For instance, if B advances 2,000 ft., B-M is about 760 ft. so M is 1,240 ft. For a uniform pay thickness, the acre-feet of pay in radial reservoirs are proportional to the square of distances. Let the fluid factor be equal to four. The acre-feet of pay within a 1,240-ft. radius is proportional to $(1{,}240/2{,}000)^2$

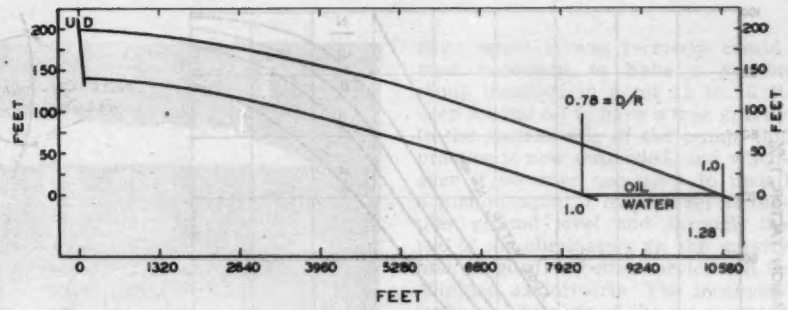


Fig. 9-5—A section through the center of a radial reservoir showing the relative position D/R of injection wells

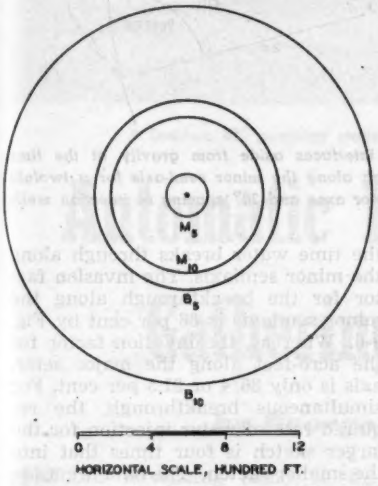


Fig. 9-3—Plan view of 500 and 1,000 ft. B contours and position of the corresponding M contours for radial advancement of injected water

and the oil displaced is 100 per cent. The acre-feet within the B-M region is proportional to $[1 - (1{,}240/2{,}000)^2]$ and the oil displaced (see Fig. 9-4) is 63 per cent. The sum of these displacements is 77.2 per cent of recoverable oil.

Convergence of Reserve

The convergence for injected water is given by

$$C = \frac{B - M}{1{,}000}$$

The displacement factor m for injected water in terms of convergence (see Part 3) is defined by

$$m = 45.3 + 8.7C - F \qquad (3)$$

For instance, the convergence for $(B - M) = 500$ is 0.5. Oil recovery averages 60 per cent of the recoverable oil within the region invaded by water for a fluid factor of four. The 60 per cent may be obtained either from Fig. 9-4 or from $m/(80 - 4)$ where m is defined by Equation 3. Solutions of Equation 3 were given in Fig. 4 of Part 3.

Location of Injection Wells

Other things equal, oil recovery is proportional to the acre-feet of pay invaded by water. The acre-feet of pay which can be invaded by water depends on several factors among which the location of injection wells relative to the distribution of oil pay is significant.

The location of injection wells on radial reservoirs is conveniently expressed in terms of the average radial distance R from the center of a reservoir to the water contact. Let D be the distance from the center of a radial reservoir to an injection well. Then D/R is the location of an injection well. When D/R is equal to unity, an injection well is located at the water contact. When D/R is greater than unity, an injection well is located downdip from a water contact.

Fig. 9-5 is a section through the center of a radial reservoir. If injection wells are located along the zero-oil contour, D/R is equal to unity for the oil along the top of pay and to 1.28 for the oil along the bottom of pay. But if injection wells are located along the zero-water contour, D/R is equal to unity for the oil along the bottom of pay and to 0.78 for the oil along the top of pay. Values of D/R less than unity have oil downdip from an injection well.

The Invasion Factor

The ratio of the acre-feet of pay invaded by water to the acre-feet of pay to be invaded by water is called the invasion factor. The invasion factor of primary interest is the one for breakthrough of water into producing wells. As an example, let there be 20,000 acre-feet of pay downdip from the structurally-lowest producing wells. Let 10,000 acre-feet be invaded at the time water first appears in the production from the structurally-lowest wells. The invasion factor for this condition would be 0.5 or 50 per cent.

Suppose the pay thickness of a radial reservoir were 60 ft. at all locations updip from the zero-water contour. Suppose the reservoir were separated into 60 individual pays by imaginary surfaces parallel to the top of the reservoir. Let there be N injection wells located at D/R for a given individual pay. The invasion factor I relative to breakthrough of water into a centrally located producing well is defined[1] by

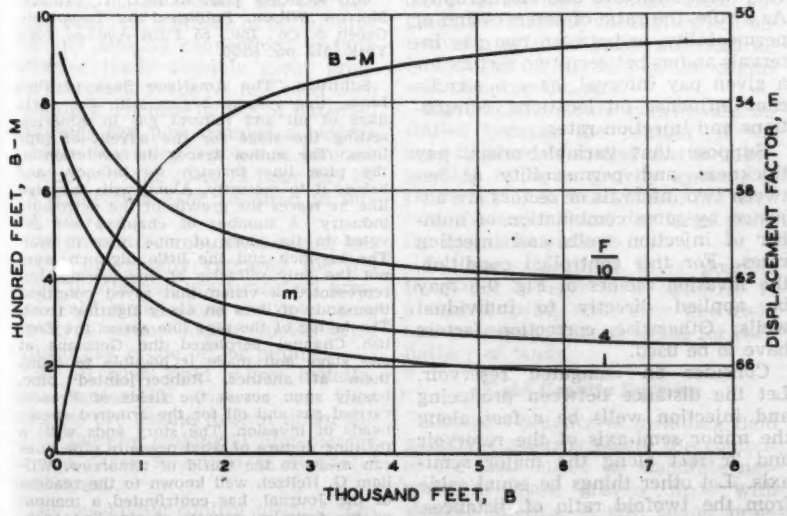


Fig. 9-4—The distance between B and M contours for radial advancement of injected water and the displacement factor m for a B-M region in per cent of recoverable oil

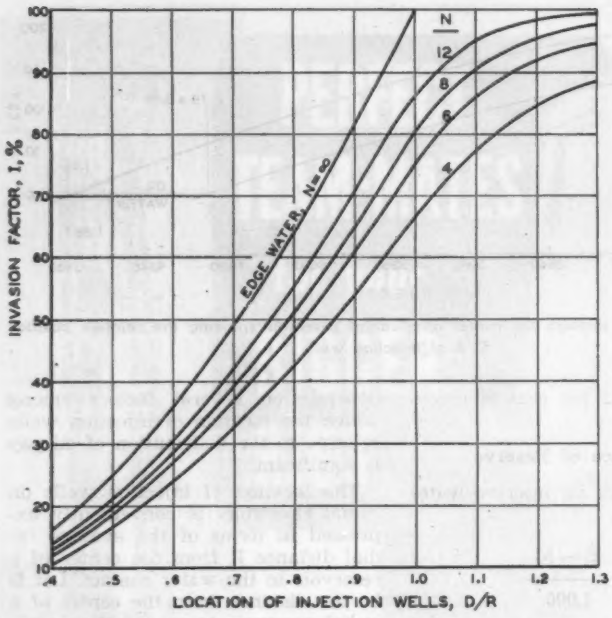


Fig. 9-6—Invasion factor vs. number of wells N and location of wells D/R for breakthrough of water into centrally located producing wells; data are aside from gravitational migration

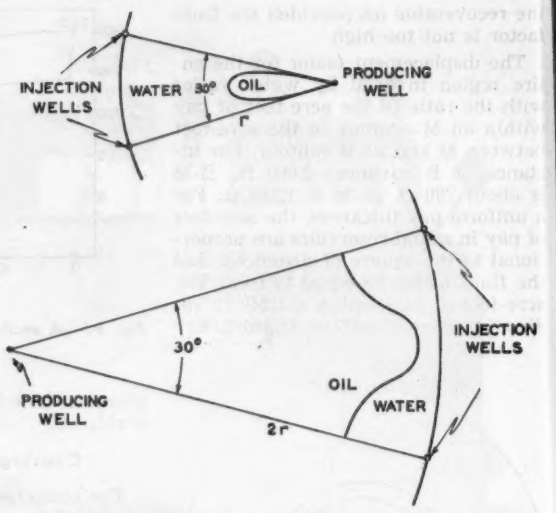


Fig. 9-7—Oil-water interfaces aside from gravity at the time water breaks through along the minor semi-axis for a twofold ratio of major to minor axes and 30° spacing of injection wells

$$I = \frac{N}{N+2}(D/R)^2 \qquad (4)$$

provided D/R is equal to, or less than, unity. But if injection wells were located downdip from the water contact, D/R would be greater than unity and the invasion factor would be defined[1] by

$$I = 1 - \frac{2}{N+2}(R/D)^N \qquad (5)$$

The curves in Fig. 9-6 are solutions of Equations 4 and 5. The invasion factor is plotted against the location of injection wells on circles of relative radii D/R. The data are relative to breakthrough into centrally located producing wells for thin radial pay intervals. The effect of gravity on the shape of the oil-water interface is not included. The principal points of interest are: (1) The invasion factor increases more rapidly with distance than with the number of wells, and (2) the rate of increase of the breakthrough invasion factor diminishes as the number of injection wells increases.

Per-Well Invasion Factors

Consider N injection wells located on a contour at R/D. Connect the center of a radial reservoir with radial lines through the points midway between wells. One injection well located at or beyond the water contact, $D/R \geq 1$, per 30° of a radial reservoir would be sufficient from the viewpoint of invasion alone. Gravity tends to maintain water advancement parallel to strike. So the water injected into 12 wells, located at or beyond the water contact along the top of pay, would be likely to advance parallel to strike without bypassing oil aside from fingering and coning of water into producing wells.

However, from the viewpoint of injection capacity, a reservoir may require several times the number of injection wells required from the viewpoint of invasion alone. As a working rule, the number of required injection wells from the viewpoint of intake capacity is more than enough to meet the requirements from the viewpoint of the invasion factor alone.

The optimum location of injection wells, completions, and injection rates vary with structure and stratigraphy. As a rule, the ratio of reserves and of permeability, as between two pay intervals and as between two sectors for a given pay interval, have a significant influence on locations, completions and injection rates.

Suppose that variable areas, pay thickness, and permeability as between two intervals or sectors are adjusted by some combination of number of injection wells and injection rates. For this controlled condition, the invasion factors of Fig. 9-6 may be applied directly to individual wells. Otherwise, correction factors have to be used.

Consider an elongated reservoir. Let the distance between producing and injection wells be r feet along the minor semi-axis of the reservoir and 2r feet along the major semi-axis. Let other things be equal aside from the twofold ratio of distances. The sketches in Fig. 9-7 illustrate the region invaded by injected water at the time water breaks through along the minor semiaxis. The invasion factor for the breakthrough along the minor semiaxis is 86 per cent by Fig. 9-6. Whereas, the invasion factor for the acre-feet along the major semiaxis is only 86/4 or 21.5 per cent. For simultaneous breakthrough, the required rate of water injection for the larger sketch is four times that into the smaller sketch. The data are aside from differences in displacement factors. The shapes of the oil-water interfaces are aside from gravity.

References

1. The Oil and Gas Journal, June 2, 1945, p. 97.

BOOKS

OIL ACROSS THE WORLD. By Charles Morrow Wilson. Published by Longmans, Green & Co., Inc., 55 Fifth Avenue, New York. 318 pp. $3.50.

Subtitled "The American Saga of Pipe Lines, this volume begins with the early days of oil and natural gas in America, setting the stage for the advent of pipe lines. The author traces the evolution of the pipe line through its infancy, and brings it to maturity. Along with the pipe line he traces the growth of the petroleum industry. A number of chapters are devoted to the story of pipe lines in war. The big-inch and the little big-inch were not the only miracles of engineering, but represented a vision that saved countless thousands of lives on every fighting front. The laying of the pipe line across the English Channel perplexed the Germans at one stage and made it possible to crush them at another. Rubber-jointed pipe, hastily spun across the fields of France, carried gas and oil for the armored spearheads of invasion. The story ends with a thrilling picture of what pressure pipe lines can mean to the world of tomorrow. William G. Heltzel, well known to the readers of the Journal, has contributed a manual on the technical aspects of pipe-line operation. There is also a long bibliography and an index.

A Louden, Ill., pumping station of Interstate Oil Pipe Line Co.

Automatic Equipment in Gathering Systems

by George B. Randels*

BEFORE advancing some of the present and future trends of gathering line systems, a review of past practices will afford a comparison to judge the progress which has been and will be made.

In the past, gathering networks have usually been set up employing pressure systems, or gravity systems just as they are today, but the materials and equipment used for such systems have outmoded older methods.

Advent of the welded and the patented coupling methods of laying pipe line and making connections to tank batteries made possible great progress in recent years. A few men with a welding machine or use of patented couplings can now connect a battery of tanks in a very few hours, in comparison with the 10 to 12-hour day by full connection gang required in former years.

The internal-combustion engine has almost universally replaced the old steam pumps and practically all pressure field installations are now using this type prime mover fueled with natural gas, crude oil, or butane.

On all such field pump installations, automatic controls or time switches are usable to shut down the units, thereby making it unnecessary for the gager to return to manually shut down.

The automatic control usually consists of automatic shutoff valve on the ground line of the tank battery, a mercoid vacuum switch, and, in case of diesels, a solenoid valve.

When the automatic shutoff valve has been set to shut off at a predetermined level, or, when the tank is empty, the valve closes, and as the unit pump continues to operate a vacuum is built up within the gravity line. When the predetermined point of vacuum is reached, the mercoid vacuum switch shorts the ignition on the gas engine and the pump shuts down. In the case of small diesel engines, the mercoid vacuum switch activates a solenoid valve automatically shutting off the fuel of the engine and stopping the unit.

Most field pressure systems are installed because the contour of the area involved is so flat that it is impossible to lay a gravity system, or production is so small it does not warrant the expenditure for large gravity lines and stations.

In many locations it is possible to gather several tank batteries to a central point with only one field unit necessary, instead of one for each battery of tanks.

Field Gravity Systems

The past practice of installing field gathering systems where the contour of the land suited an elaborate network of main gravity lines with smaller laterals, is still sound practice. However, as stated above, methods of laying lines and making tank connections of course have changed. Also, while it was formerly considered necessary to have a suction pump installed in a pit 12 to 18 ft. deep for the oil to have a true gravity to the suction side of the pump, this practice is now outmoded, and whenever it becomes necessary to install a suction pump it may be set at regular ground level and through the use of air eliminators on the gravity line, as good or better service can be obtained as formerly. The inconvenience and hazards of the pit-operated pump are thereby eliminated, to say nothing of the additional cost of the original installation.

Since the practice of basing crude-oil prices on gravity was inaugurated, it has become necessary for the industry to maintain the gravity of the oil by the installation of closed gathering systems, and the more recent systems are built on this plan.

When using the closed-system method, air eliminators may well be installed on gravity lines and automatic shutoff valves on tank batteries to avoid as much air and vapor entering the system as possible.

Pumps used in this type of service should be equipped with composition pistons to avoid scarring liners in case pumps are allowed to run partly dry when pulling a vacuum on lines.

In case a complete closed system is not desirable, a small 5,000-bbl. tank with floating roof may be installed and the evaporation losses will be greatly minimized in comparison with the old system of handling oil twice through old wooden tanks or cone-roof tanks.

One of the items of vital importance in present-day and future planning of gathering systems is coordination between the producer and pipe-line representatives in setting field tanks so as to realize the maximum results from field gravity systems. Building of small tanks should be avoided as much as possible, as they increase cost of operation and investment.

Full cooperation with producers has made it possible to eliminate most of the "over the hump" pumping with low-pressure field pumps, particularly where the planning has been coordinated in advance of the setting of the tank battery.

The general trend in gathering system is to more automatic equipment, flow meters which may be used to check field runs, lubricated plug valves for field tanks to avoid leakage, welded main gravity lines, and patented coupling lines for laterals, air eliminators, and various types of shutdown equipment on machinery making it unnecessary to have an attendant on duty at all times as in the past. By these improved methods the operating cost can be greatly reduced and the oil will be delivered to destination with no loss in gravity, and double-checked by metering.

*General superintendent, Interstate Oil Pipe Line Co.

Calculated Effect of Pressure Maintenance On Oil Recovery—*In Fullerton Field, West Texas*

by Robert L. Hoss*

SUMMARY of calculations is given here for the future performance of the Fullerton field, Andrews County, West Texas, under primary depletion and also for two programs of pressure maintenance by gas injection. The only driving mechanism assumed to be active in this field is solution gas. The basic differential equations employed are those developed by Muskat† for analyzing reservoirs possessing this type of drive. This article is from the presentation made at the joint meeting of all Texas sections of the A.I.M.E. held at the University of Texas, Austin, December 18-19.

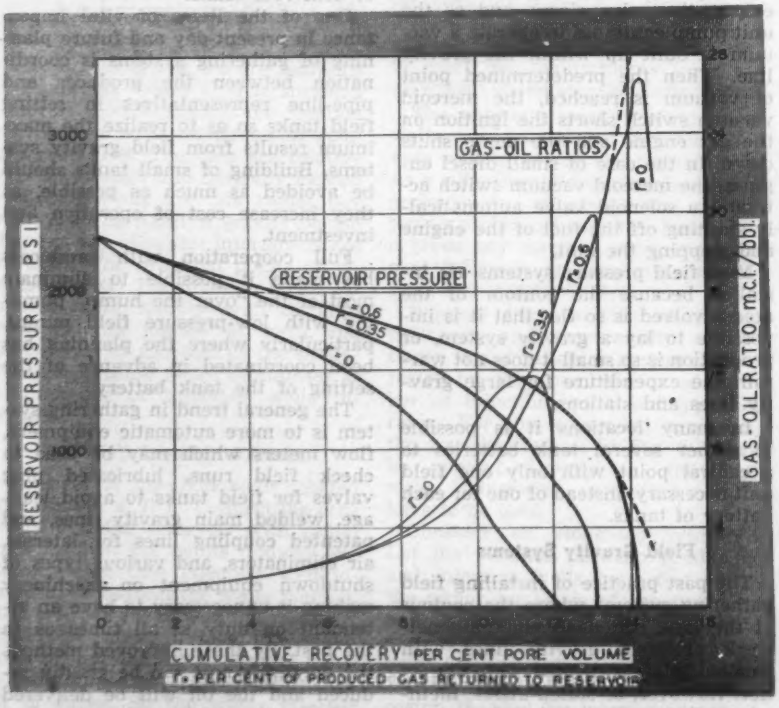
THE Fullerton field is located on a broad anticlinal structure, having approximately 330 ft. of productive closure. Production is from the Lower Clear Fork, a dolomitic limestone of Permian age, occurring at an average depth of 6,800 ft. The producing horizon is divided into three zones by dense barren sections of dolomitic limestone.

For the purposes of this analysis the areal extent considered was about 30,000 acres, being 10 miles long north and south and 5 miles wide east and west. The productive volume of the formation is 3,473,585 acre feet, containing 1,189,600,000 bbl. of oil in place initially. In this analysis all three zones were taken as one, having an average thickness of 122 ft., since the fluid characteristics from all zones are the same.

*Graduate student, department of petroleum engineering, University of Texas.

FULLERTON FIELD—SUMMARY OF CALCULATED FUTURE PERFORMANCE DATA

Recovery method—	Cumulative oil prod., per cent— Decrease in residual saturation	% pore volume	Initial reservoir oil in place	Increase stock-tank oil	Avg. gas-oil ratio cu. ft. per bbl.	Max. gas-oil ratio cu. ft. per bbl.	Abandonment pressure psig.
No gas return (r = 0)	36.7	12.6	25.2	0	5,595	11,810	50
35% gas return (r = 0.35)	41.0	13.7	27.7	9.8	9,262	19,900	300
60% gas return (r = 0.60)	40.7	14.8	30.1	19.5	13,441	26,800	300



This graph shows the computed future reservoir pressures and gas-oil ratios as related to oil recovery, for 0, 35, and 60 per cent gas return in Fullerton field

Permeability

Permeability of the productive formation ranges from 6.7 to 12.6 millidarcys, and the porosity from 7.7 to 11.4 per cent. The connate water is considered to be constant at 24 per cent. Through the section, the porosity is comparatively regular for a limestone, except for occasional streaks of cavernous porosity. Based on the porosity and permeability ranges stated above, the formation may be considered intergranular. Initial reservoir pressure was 3,000 psig.

It is possible to express mathematically the relationships between the various physical properties of the fluids which exist in a gas-drive reservoir. The equations† in differential form can be applied to any solution-gas-drive reservoir to predict the change in residual-oil saturation and gas-oil ratios as a function of the reservoir pressure. The derivation for a solution-gas drive is based on Darcy's Law and those concepts which have resulted from past study

†M. Muskat, "The Journal of Applied Physics," March 1945.

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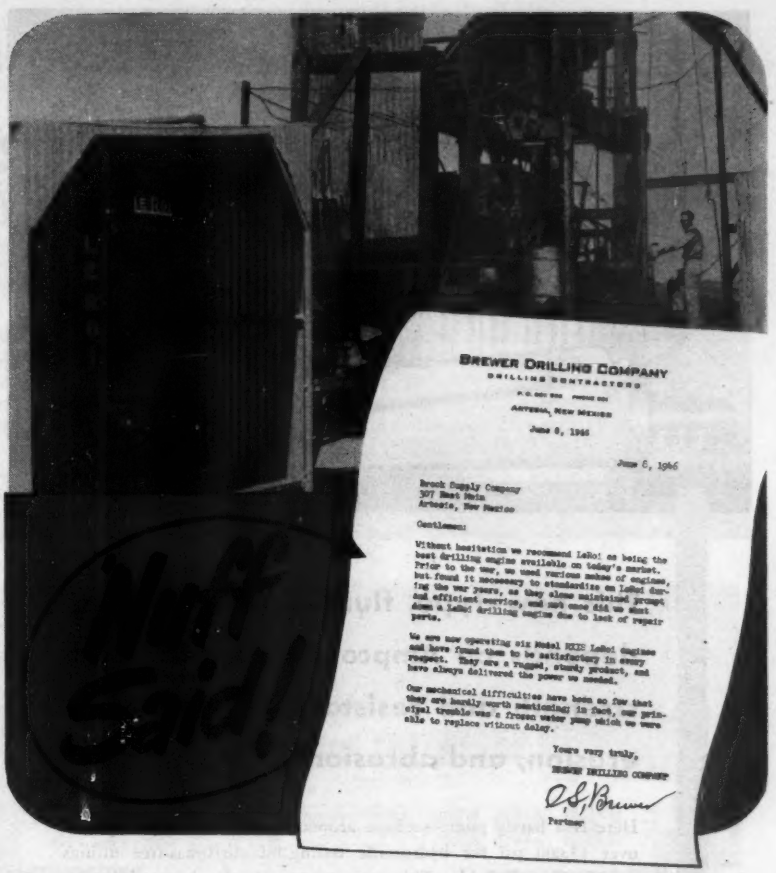
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. . . widespread praise from drilling contractors and crews is proof that the unusual dependability, power, and acceleration of LE ROI engines save time and make money

This letter is typical of the way oil-field men feel about Le Roi engines. Behind this feeling is the universal knowledge that Le Roi reserve power, rapid acceleration, and dependability mean less trouble — greater profits.

But, here at Le Roi, we feel that making the best drilling engine isn't enough. We have also made it our business to provide the best possible service. Extensive stocks of service parts are maintained in all locations. Completely-equipped distributors and factory branches can render immediate service any time of day or night.

You know of course that Le Roi engines range in size from 4 to 400 hp, and that they operate on natural gas, butane, or gasoline. However, it pays to keep posted on new Le Roi developments — see your Le Roi distributor regularly and write for latest bulletins.

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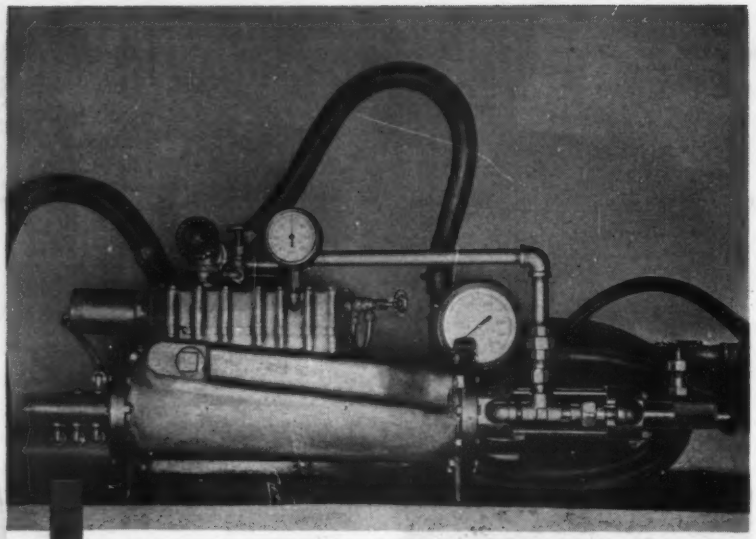
P-88



This new-type, fluid-activated pump depends on Ampco Bronzes for high strength and resistance to corrosion, erosion, and abrasion

Here is a handy pump to have around. It supplies a pressure of over 15,000 psi for hydrostatic testing of christmas-tree fittings used in the oil fields. This same pump can also be used for injecting a chemical into a line in any proportion desired. Other applications include the homogenizing of milk, maintenance of high car-washing pressures, spray painting with red lead, etc.

Here's what the engineer who helped design this pump says about its construction:

"The main castings and most parts of the pump are of an aluminum bronze which has high strength, great resistance to sea-water corrosion, and particularly great resistance to erosion and abrasion. (He is talking about Ampco Bronzes.) Because of the excellent wearing qualities, no liner is required in the main cylinder. (He's still talking about Ampco Bronzes.) This alloy is the same used for safety tools, and the non-sparking quality presents a desirable safety feature in use around explosive paint sprays, natural gas, and other explosive fluid mixtures. (He keeps on talking about Ampco Bronzes.) The exterior of the pump has a pleasing golden color and does not require painting or other upkeep."

Ampco Metal is a complete aluminum bronze series, varying from soft to hard, with physical quality closely controlled to fit specific service conditions. Call in an Ampco field engineer or write for bulletins and find out how Ampco Metal can help you.

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P-14

of flow of single and multiphase fluids through porous media.

The equations express the interrelatedness of all the physical properties of the fluids in place in the reservoir, and relate the net effect of the change in these variable properties to pressure decline.

Solving these differential equations involves a direct numerical integration by a step-wise process. The elimination of tedious trial-and-error processes by the use of this direct method is a definite improvement over the usual methods employed to predict solution-gas-drive reservoir behavior.

Knowing the relationship of gas and oil viscosity, gas compressibility, and differential liberation of dissolved gas, all as a function of pressure, average numerical values of these variables may be taken over short pressure decrements of 100 psi. and substituted in the equations. By repeating this process for successively lower pressure steps, using the average pressure value within each decrement, the residual-oil saturation of the reservoir may be successively reduced from an initial value of 76 per cent to some final residual saturation. Once the residual saturation at a particular pressure has been calculated, the gas-oil ratio at that saturation may be calculated from relative permeability data. In these calculations the withdrawals were assumed to begin with the saturation pressure, 2,370 psig. An estimated initial withdrawal of 14,940,000 bbl. occurred before any reduction in oil saturation occurred, e.g., between 3,000 and 2,370 psig.

The results of these calculations for primary recovery and two pressure maintenance programs are shown (see figure), where r is the decimal fraction of the produced gas which is returned to the reservoir. Reservoir-performance data from the figure are summarized in the accompanying table.

Final prediction of the production history of a reservoir requires that pressure decline, production volumes, and gas-oil ratios be expressed as a function of time. This was done by using the daily per-well allowable as set by the Texas Railroad Commission, and assuming this prorated rate to remain constant throughout the life of the field. By placing the reservoir performance on a time basis, some estimate is had of the producing life of the reservoir and of the effect on this life of the degree of pressure maintenance employed.

John W. Watson, New York, has been appointed vice president and treasurer of Shell Chemical Corp., effective January 1. He started with Shell in St. Louis in 1930 as assistant comptroller, later serving in New York as treasurer.

Improved Marine Equipment Facilitates

DISTANT OFFSHORE EXPLORATION

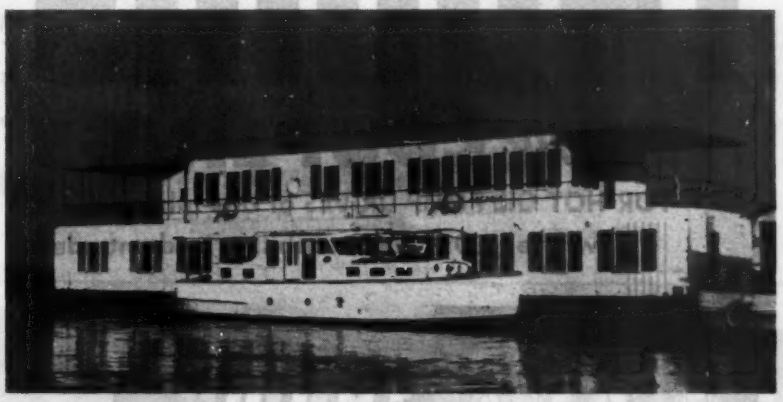
by E. H. Short, Jr.

ABOUT 3 years ago The Superior Oil Co. began a series of seismic surveys in the Gulf of Mexico which successfully extended the frontier of workable seismograph territory from inland bays and shore lines to points over 26 miles out in unprotected waters.

At the present time there are perhaps four companies engaged in distant offshore seismic work in Gulf waters. The trend of improvement in marine equipment used in this type of work, and a general recognition of the vast seismic hunting ground which exists at many points in a 40-mile strip of water bordering the coast from lower Texas to the tip of Florida, indicate that distant offshore shooting will be regarded for some time as an important coastal project.

Numerous underwater shoals exist in various parts of this area 35 to 40 miles from shore and the depth of water is around only 40 ft. While the drilling of a well in water of this depth is still an engineering challenge, considerable investigation is under way on the problem of designing drilling structures which will withstand the strong currents and wave action present in distant offshore, unprotected waters. At the moment, however, it appears that the technique for conducting distant offshore seismic surveys is somewhat in advance of the engineering knowledge as to how the areas now being worked can be drilled within economic bounds.

In the relatively short 3-year period of time the seismic fleets used by the companies operating in Gulf waters have shown tremendous improvements. The size of the craft has been increased to permit safer operation in rougher water than was possible with boats used at the start of the work. Most of the boats now being used have been specifically designed to meet the peculiar conditions imposed by distant offshore work.



Above: Superior quarters boat "Arcadia." This all-steel fireproof vessel is said to be one of the finest ever built. An air-conditioning system changes air every 90 seconds, controls humidity, and keeps temperature at 72°. Hot air is used in cold weather. Boat alongside the quarters boat is a 42-ft. cabin cruiser powered by a 130-hp. gasoline motor. It is used in taking crew and other personnel into Abbeville, or in getting supplies to fleet. Left: Present base of operation is on bleak Marsh Island 30 miles southwest of Abbeville, La. Seismic boats range for many miles out into the Gulf. At night they put into nearest cove or return to quarters boat at Marsh Island

The Superior Oil Co.'s seismic water unit, now based approximately 30 miles southeast of Abbeville, La., on Marsh Island, is considered one of the best-designed units operating in Gulf waters. All boats are specially designed and the new quarters boat has accommodations comparable to the finest of hotels.

When Superior first embarked upon the project involving distant offshore shooting, the matter of obtaining

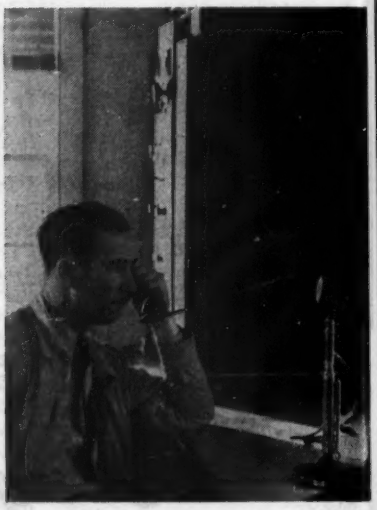
Closeup of surveying boat "Pintail." This 23-ton cruiser is a twin-screw model, powered by two 100-hp. full-diesel engines. It is equipped with an electric reel having a 16,000-ft. wire-line capacity

boats adequate for the hypothetical conditions expected at great distances from the shore posed a problem, but under wartime limitations the problem finally resolved itself into a matter of taking almost any type of boat available. One boat in the original fleet, for instance, had formerly been the pleasure craft of a movie star. The first Superior fleet therefore was composed of a rather assorted array of craft, the limitations of which had to be determined by gradually working farther and farther away from shore. Since there was no way to get weather reports to the boats, it was necessary for the crew to keep one eye cocked toward the horizon for storm clouds. In the event a sudden squall approached it was necessary to gather up geophones, communication lines, and buoys and attempt to reach a shore-line cove before the storm broke. K. G. McCann, chief geophysicist for Superior, personally directed the first distant offshore seismic work and his on-the-water observations as to necessary specifications for boats to be used in this type of work are incorporated in Superior's new fleet.

The present Superior fleet consists (not including auxiliary craft) of five 50-ft. boats the average size of which is approximately 25 per cent greater than the original fleet. The design of these boats provides for more space around the cabin than the original sport-type craft had and also more front deck space.

Superior's New Fleet

Loon—Recording boat, cruiser type, 23-ton displacement, 100-hp. marine engine. Pintail—Survey boat, cruiser type, 23-ton displacement, twin screw-2-200 hp. marine engine. Black Mallard—Backsight boat, logger type, 23-ton displacement, 100-hp. marine engine. Red Head—Shooting boat, logger type, 23-ton displacement, 100-



F. M. and ship-to-shore radio room aboard the Arcadia. At time picture was made, R. E. Wilder, chief of party, had just warned his fleet of an approaching storm, and ordered their return to the quarters boat under full speed

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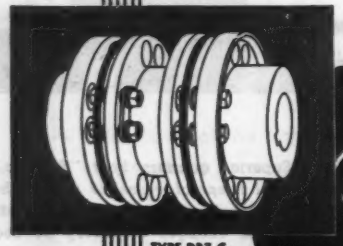

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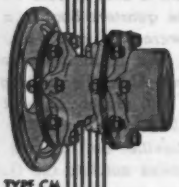

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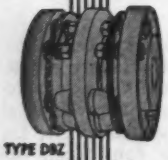

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hp. full diesel. Green Head—Shooting boat, logger type, 23-ton displacement, 100-hp. full diesel.

All boats are equipped with two-way F.M. short-wave radio sets. This has greatly increased the efficiency of offshore shooting, enabling the crew to make more spreads in a day's time. In operating with the old fleet, when a spread was made each shooting boat had to come alongside the observation boat and put out telephone line to its position 2,000 ft. away. When the spread was shot it was necessary to take up the line and place it in the observation boat.

Each boat is equipped with a 32-volt electric system which furnishes power for radio, electric cooking stoves, lights, and catheads. Comfortable sleeping quarters for the entire crew have also been included in the design of the boats. Since meals can be cooked on board, the boats can anchor in the nearest cove at night.

One of the most important additions to Superior's present water-seismograph setup from a standpoint of operational efficiency is the splendid quarters boat recently completed by the Platzer Shipyard, Houston, to Superior's specifications.

An inspection of the boat indicates that cost was regarded as of secondary importance in providing every known feature which might contribute to the comfort of the men. It is air conditioned throughout and a constant temperature of 72° is maintained at all times. Large state rooms provide sleeping accommodations for 31 people.

A lounge room in the front portion of the main deck of the boat is equipped with radio, divans, game table, and library.

A large office is located on the top deck and directly across a hall is a radio room. Radio equipment consists of FM short-wave set and ship to shore unit. Weather reports are received at frequent intervals and impending storm information is transmitted to all seismograph fleet boats.

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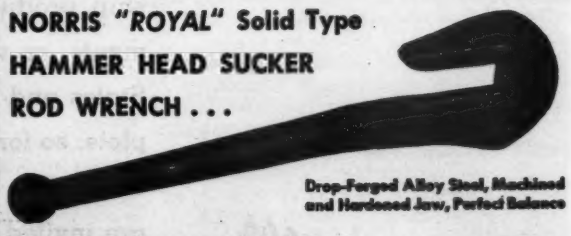

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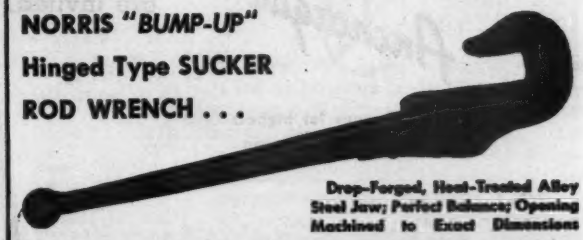

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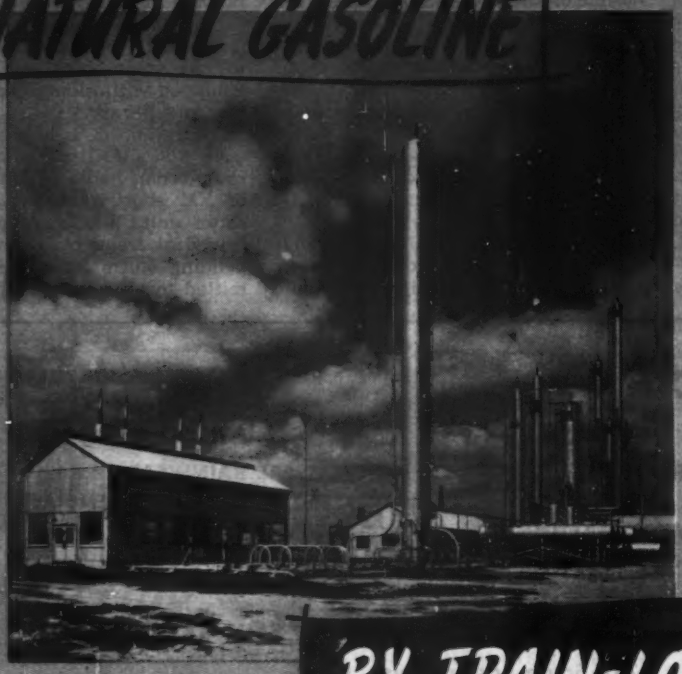

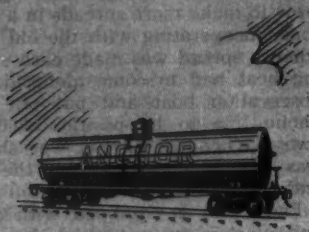

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

This department was created for the purpose of aiding managers, superintendents, engineers, chemists and all those engaged in various phases of plant operation, as well as those connected with the marketing and utilization of petroleum products. Readers are invited to submit their problems to W. L. Nelson, technical editor. Inquiries must be signed, but only the initials will be printed.

Specifications—Steam Refined Stock

We are interested in securing information relative to specifications on steam refined stock.—E. N. P.

From the manufacturers standpoint the main specifications of cylinder stocks are Universal viscosity at 210° F. and fire point. The trade journals list:

Western Pennsylvania:
- 600 S.R. filterable
- 650 S.R.
- 600 filtered
- 630 filtered

Mid-Continent:
- 600 S.R. dark green
- 600 S.R. olive green

Chicago (from Mid-Continent crude):
- 140 unfiltered S.R.
- 160 unfiltered S.R.
- 200 unfiltered S.R.

The numbers in the range of 600 refer to fire point and those in the range of 150 to viscosity.

There are, of course, many other properties that are significant but not altogether fixed or necessary for some markets. Thus, flash point, gravity, pour point, and precipitation number are properties found in the specifications of lube pools purchased during World War II (see Table 1).

When specific applications are considered even more requirements or specifications appear. The Department of Navy, Bureau of Ships, Pamphlet NBS431 entitled, "Lubricating Oil, General Information, Requirements, Methods of Test" lists the general steam-cylinder services as follows:

Oil 1150 and 5150—For dry saturated steam up to 300 psig. where condensate is used for boiler feed, ice making, etc.

Oil 5190—Same as 1150 and 5150 except for superheated steam.

Oil 6135—Counterflow stationary engines using dry or saturated pressures of 90 to 175 lb. and operating on loads not less than 75 per cent of rated capacity.

Stationary engines using wet steam above 100 lb. pressure with loads less than 75 per cent of rated capacity.

Counterflow steam engines using high-pressure, high-temperature steam but operating at low loads.

Steam cylinders of noncondensing engines and pumps.

Small steam engines in public buildings, etc., operating on pressures from 60 to 175 lb.

Steam shovels, locomotive trains, steam hoists, reciprocating steam engines (inland waterways and reclamation work), control and manipulating steam cylinders, small uniflow engines operating on steam pressures under 160 lb.

Condensing engines where condensed exhaust is not utilized or if plant equipped for proper separation, where condensed exhaust is utilized.

Counterflow engines using wet steam pressure below 90 lb. Small steam engines operating on steam pressures under 90 lb. Low-pressure cylinders of compound steam engines where superheat is not used in the high-pressure cylinder. Control and manipulating steam cylinders operating intermittently.

Small portable steam engines operating in field service.

The main specifications of these four Navy oils are shown in Table 2.

The specifications also require no free sulfur or corrosive compounds, no SO_3 as sulfonates, no water, and a neutral reaction. Color and gravity are to be recorded but not specified. The oils are straight mineral oils except 6135 which is compounded.

Even other sources may be consulted such as Forbes, "Lubrication," page 97, etc., John Wiley & Sons, New York, 1943, and the current Federal Specifications for Oils: Lubricating, Steam Cylinder, Mineral and Compounded.

TABLE 1—LUBE POOLS OF CYLINDER STOCKS

	150° Cyl. stock	180 Cyl. stock	220° Cyl. stock	280° Cyl. stock
Gravity at 60° F., A.P.I., min.	25	...	24	23
Flash point, P.M.C.C., °F., min.	500	500	550	565
Pour point, °F., max.	60	80	50	50
Viscosity, S.U. at 210° F., sec. min.	150	180	220	280
Precipitation No., max.	0.1	0.4	0.1	...

*Must be Pennsylvania S.R. residual cylinder stock.

TABLE 2—U. S. NAVY BUREAU OF SHIPS STEAM CYLINDER OILS

	1150	5150	5190	6135
Neutralization No., max.	0.1	0.15	0.15	1.0
Fixed or fatty oils, per cent	none	none	none	*5-7
Precipitation No., max.	none	0.05	0.05	0.05
Carbon residue, per cent, max.	1.8	3.0	3.25	2.50
Ash, per cent, max.	none	0.05	0.05	0.05
Flash point, °F., min.	510	490	525	475
Pour point, °F., max.	30	60	60	60
Viscosity, S.U. at 210° F., sec.	140-160	135-165	180-240	120-150
Viscosity index, min.	95	...	...	...
Emulsion test, minutes, max., in:				
Distilled water	60	...	...	...
1 per cent salt solution	60	...	...	...

*Tallow oil.

Graph Paper for Vapor Pressure

We have been attempting for some time to obtain special graph paper which will plot vapor pressures against temperature for various substances as straight lines. Do you know where we may buy paper of that type?—W. W. B.

In the oil industry such graph paper is often referred to as Cox paper, or a plot of straight-line vapor-pressure curves as a Cox chart. Such graph paper has been used and is being used in many research laboratories but to the knowledge of this department, has not been offered commercially. Failure to adopt a standard graph paper is probably due to the fact that different types of materials require slightly different scales on the graph paper.

The Young and Ramsey-Young equation for correlating vapor pressure, both derived from the Clausius-Clapeyron equation, is:

$$p = A + B/T$$

in which T is the absolute boiling point at pressure p, and A and B are constants. Theoretically, straight lines should be obtained by plotting log p versus 1/T. E. R. Cox (Ind. Eng. Chem. 15, 592, 1923) found that straight lines were obtained for the normal paraffin hydrocarbons if $1/(382 + t)$ was used as one scale rather than $1(460 + t)$, and such a chart is called a Cox chart. The symbol "t" refers to boiling points in degrees Fahrenheit. Various constants other than 460 and 382 are required by different groups of compounds.

Largest Unit of Kind In World

(Continued from page 47)

able hydrostatic heads dictate that the strippers be used in the same vertical order as the draw; that is, with the top draw in the top stripper, etc. The strippers are unlined and the trays are all cast iron.

The entire hot-oil section of the plant is protected from corrosion through the use of alloy steels. In the bubble-tower region, however, some exceptions were made after considering the corrosion tendency and ease of replacement.

Debutanizer

The design of the 4 ft., 36-bubble-tray debutanizer follows the conventional pattern. The tower is unlined and all trays are cast iron. To accommodate possible depropanization, the design working pressure was set at 330 psi.

Coking

The heated mixture of vapor and liquid from the furnace enters the bottom of the coke drum. Since only vapors can pass out the top of the drum, any liquid must remain in the drum until it is cracked to vapors and coke. As coke is deposited the incoming liquid and vapor must flow through the coke bed and through or into the liquid on top of the coke. With vapors and liquid continually flowing through the coking region, the coke deposited is of a highly porous nature, which facilitates subsequent handling and contributes to the quality of the product. Each drum remains on the line for 24 hours during which time approximately 250 tons are therein deposited.

Decoking

Drum cycle.—Operation of the coke drums requires that the furnace transfer line product be switched from one drum to another whenever a drum is filled with coke to the desired outage. At normal feed rates each drum is on stream coking for 24 hours and is off stream for cooling, decoking, and heating up for the same period. The drum switches are so timed that one of each pair of drums comes off stream every 12 hours. Under normal conditions the cycle for one drum is about as follows:

LOG OF A TYPICAL DRUM CYCLE

Elapsed time (hours)	Operation
0.0	Switch oil stream to clean drum. Steam full drum to bubble tower.
0.5	Stop steam to bubble tower, steam to blowdown.
0.75	Stop steaming, start cooling with water.
2.75	Stop cooling, start draining water, blinding and unheading.
4.0	Start decoking.
11.0	Finish decoking, start heading up and removing blinds.
12.5	Steam test.
13.0	Finish steam test.
18.0	Start heating.
24.0	Switch in oil stream from full drum.
48.0	Switch oil stream to clean drum.

The transfer line from each furnace is connected to a three-way switch valve which diverts the transfer-line product to either coke drum or through a bypass line to the bubble tower. Before switching the oil from one drum to another, the empty drum is preheated by forcing some vapors from the on-stream drum into the top and pumping the condensate from the bottom of the drum into the bubble tower.

Blowing down.—Whenever the oil stream is switched from a full to an empty drum, the full drum must be purged of volatile oils and cooled down so that decoking operations can be started. After switching out of a drum, steam is immediately cut into it, both into the transfer line to the bottom of the drum and into a steam ring just above the bottom cone. The full drum is steamed to the bubble tower for 30 minutes and is then depressured to the blowdown system. After 15 minutes steaming to the blowdown, the steam is cut out and water pumped to the steam ring.

This cooling produces considerable steam which must be handled in the blowdown system located about 2,000 ft. from the unit area. The blowdown line exhausts into a small tank about 6 ft. below a water level maintained by a continuous circulation through the tank. The circulation is sufficient to remove the superheat of the steam and to condense any oil vapors. Some saturated steam is vented from an 80-ft. stack mounted on top of the tank. The overflow from the tank runs into a skimming sump to remove any oil. The sump water is cooled by circulation over a two-bay cooling tower, and a portion of the circulating water is diverted through the blowdown tank to maintain the level. The cooling tower was not designed to handle the instantaneous heat load, but rather the average heat load, the volume of water in the system acting as a flywheel or heat reservoir.

When the coke bed has been cooled to 200°-300° F., the cooling water is cut out and the drum drained. It is then ready for the decoking crew to start blinding off, opening the heads, and removing the coke. (For details and illustrations of the decoking, see pages 46 and 47).

When the drum is completely clean the transfer line and condensate line are inspected and cleaned if necessary, the steam-out valves are blasted with steam, and the drum heads are replaced. After removing blinds and steam testing, the drum is ready for heating prior to another 24 hours of coking service.

Operating Conditions and Yields

Currently the unit is charged with 700 S.S.F./122 straightrun residuum from Wilmington crude at a rate of 15,000 bbl. per day which effects a recycle to fresh feed ratio of 0.33/1. The 20,000 bbl. per day charged to the furnaces are heated to 920° F.

The bubble tower is operated to produce gasoline with an end point of 380° F., light gas oil with an end point of 650° F., and medium gas oil as necessary to maintain a level in the bubble-tower bottom reservoir. No heavy gas oil is being removed. In the stripper tower the gas oils are stripped to a flash point which makes them suitable for use as cutter stock, although at the present time the light gas oil is used as T.C.C. charge. Tests are being made to test the feasibility of also using the heavier gas oil in T.C.C. charge.

Under the above operating conditions the following yields were obtained. Additional operating conditions have also been tabulated.

OPERATING CONDITIONS AND YIELDS

Operating conditions:	
Reduced crude charge, bbl./day	15,000
Furnace charge, bbl./day	20,000
Recycle/fresh feed	0.33
Temperatures:	
Furnace outlet, °F.	920
Drum inlet, °F.	900
Drum outlet, °F.	830
Drum pressure, lb.	56
Viscosity of fresh feed, S.S.F./122	700
Yields:	
Total gas, weight per cent	14.0
Raw B-B, liq. vol. per cent	0.8
Debutanized gasoline, liq. vol. per cent	22.5
Light gas oil, liq. vol. per cent	36.5
Medium gas oil, liq. vol. per cent	16.7
Coke (by difference), wt. per cent	19.1

As would be expected wth this type of process, the high-sulfur Wilmington residuum charge yields a gasoline with an appreciable sulfur content. This sulfur content and the olefinic content of the gasoline are sufficient to require sweetening and rerunning. Motor method clear octane numbers in the neighborhood of 70 are obtained with an octane spread of 8 or better. Lead susceptibility is fair and commensurate with the sulfur content.

Because of the desulfurizing characteristic of the T.C.C. process, the coker gas oils have proven to be quite satisfactory at T.C.C. charge stock despite their high-sulfur contents. The 650° F. end point light coker gas oil, when charged to the T.C.C. units (bead catalyst) with a 1:1 recycle ratio, yielded 41 per cent of 400° F. end-point debutanized gasoline. Furthermore, an octane level of 79 motor method clear and an octane spread of 10-12 points make this operation look quite attractive.

The low raw B-B yield is a result

of the large gas yield from the bubble tower reflux accumulator which carries with it the bulk of the C_4 production. The total gas yield amounts to 8,000-9,000 M.c.f. per day. The dry gas after absorption amounts to some 7,000 M.c.f. per day which is just double the requirements at the coking-unit furnaces. The excess 3,500 M.c.f. per day represents an appreciable contribution to the other refinery units' demands.

Unit Flexibility

The unit is quite flexible in that it can be used either as a coker, a visbreaker, or any combination of these two. For any operation other than full coking a higher inlet to the coke drum would be used. The rate of residuum withdrawal from the bottom of the drum would determine the amount of coking permitted. In a full visbreaking operation, it is also possible to charge the fresh feed directly to the furnace along with the recycle. Under this arrangement, the residuum would be removed from the bubble tower bottom and the recycle from the bottom draw.

Fire Protection Equipment

by Henry W. Boggess*

A FIRE-PREVENTION program designed to minimize the occurrence of fire should also include fire-protection equipment just as a safety program, although designed to minimize accidents, includes first-aid training. It should be recognized that regardless of steps taken to prevent fires, the oil business is extremely hazardous and deals with inflammables and with sources of ignition and that fire may occur at any and all locations. All locations must have protective fire-fighting equipment instantly available and in serviceable condition in the event a fire breaks out.

Fire is combustion or rapid oxidation of a substance at or above its kindling point. If oxygen is absent, combustion or burning will not take place, no matter what the temperature; conversely a substance too cold to burn will not catch fire even though there is an abundance of oxygen. Hence, there are two methods by which fire may be extinguished:

1. Exclusion of oxygen from the burning substance (commonly known as smothering or blanketing).
2. Cooling the burning substance below its kindling point.

All fire-fighting methods embrace one or the other of these principles or an application of both. Further, it should be realized there are four kinds or classes of fires and that each of these classes can be more effectively combated by the use of fire-fighting equipment designed for that particular type. The National Board of Fire Underwriters classify fires as follows:

Class A.—Defined as incipient fires in ordinary materials such as wood, rags, rubbish, etc. This class of fire is best combated by reducing the temperature of the burning substance below its kindling point. Hence, solutions containing large percentages of water, or water alone, are of first importance.

Class B.—Defined as incipient fires of flammable liquids such as gasoline, greases, oils, lacquers, paints, etc. To combat this class of fire, an agent which smothers or blankets is essential. Water will spread this type of fire unless it is applied under sufficient pressure and with proper equipment to produce "fog."

Class C.—Defined as incipient fires in electrical equipment where the use of an extinguishing agent which is a nonconductor of electricity is of prime importance. Any fire-fighting agent containing water is a poor medium.

Class D.—Defined as incipient fires in automobiles, trucks, and other mobile equipment where a smothering or blanketing agent is necessary for extinguishing.

To become familiar with the classes or types of fire and the specific fire-fighting agent designed for each, the study of a composite chart is the best medium. Such a chart also may be used as a convenient reference and kept readily at hand. In lieu of the next Safe Field Practices article, a composite chart giving the classes of fires, the various kinds of fire-fighting agents, their composition, effective ranges, etc., will be published.

*Superintendent, Employment - Insurance and Safety, Sinclair Prairie Oil Co.

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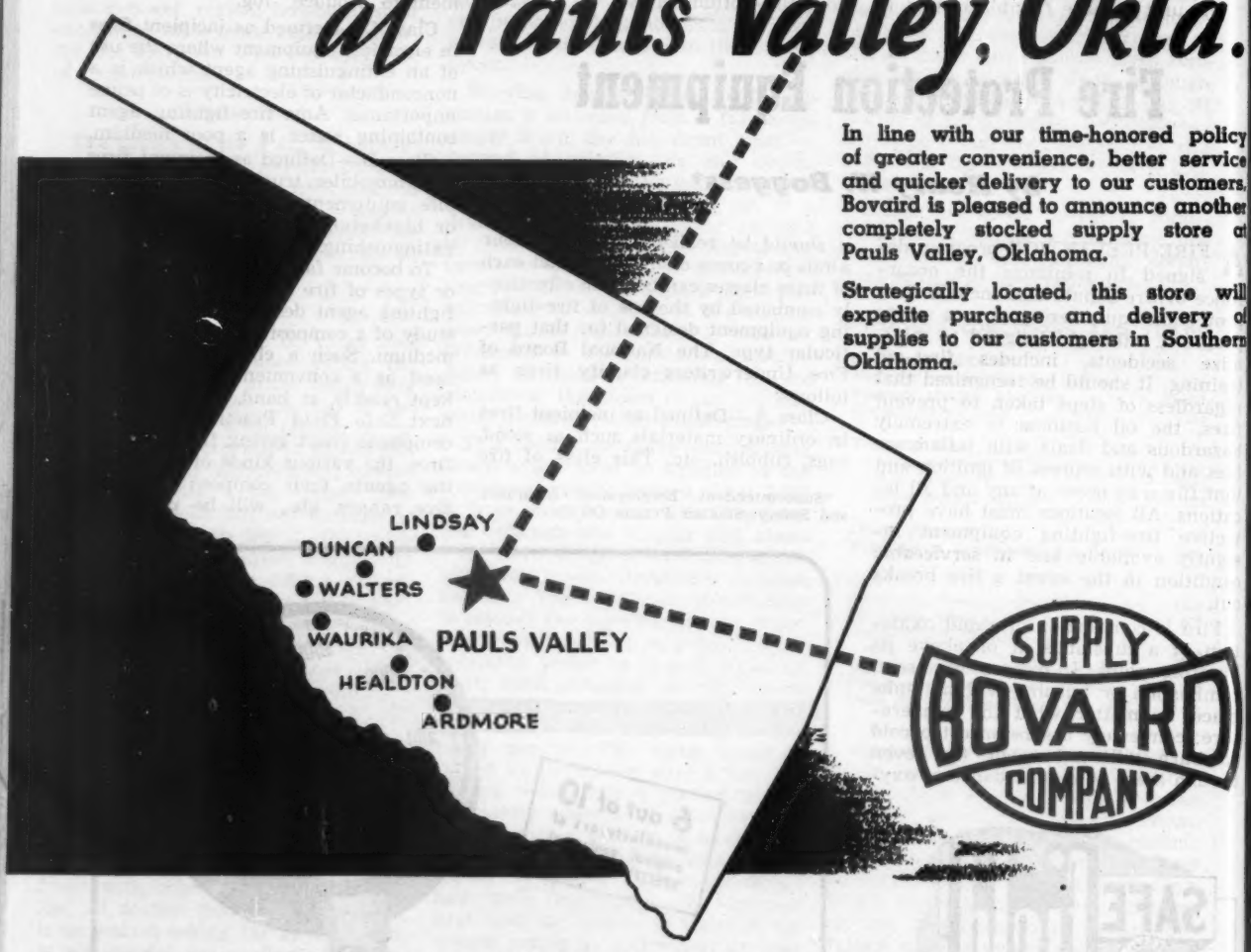

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Plant Practices:

Fixture for Repairing Tube Bundles

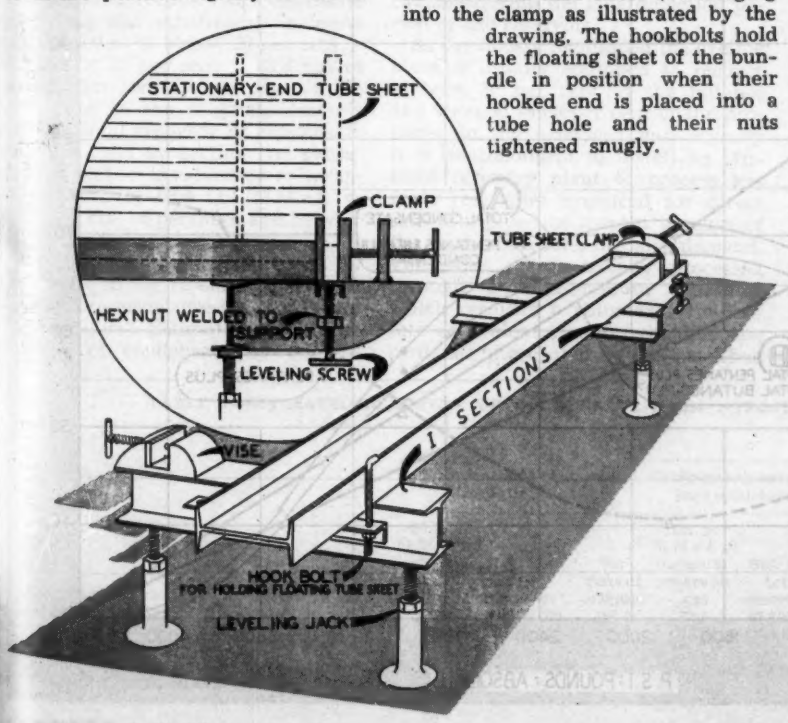
ACCURATE alignment of tube sheets and baffle plates is maintained for retubing exchanger bundles, with the fixture shown in the accompanying drawing. All parts for the fixture, one of several employed by the refinery's maintenance department, were assembled in company shops at relatively little expense.

The particular fixture from which the drawing was made is not adjustable fully for tube-bundle length because several units of different fixed lengths are employed to accommodate the standard-length exchanger bundles used in the refinery. Where desirable to have the fixture adjustable for various-length bundles it is necessary only to move the structural angle to which the hook bolts are attached to the desired position near the bundle's floating tube sheet. In constructing the fixture for variable lengths caution should be used in locating the cross supporting member so that it will not interfere with the member which carries the hook bolts. Interference of these two members may be avoided if the longitudinal member upon which the bundle rests is located outside of the maximum length of any of the bundles to be repaired.

Bolting may be employed to assemble the transversal and longitudinal I-beam sections provided care is taken to insure positive rigidity of the assembly. However, welding provides, in general, the best method for assembling the fixture and insures the necessary rigidity for producing a good retubing job.

The cross member at the floating tube sheet end is extended on one side to accommodate a small shop-made vise which is used for holding the tube sheet while removing the tube stub ends from it. Leveling jacks, made of 2½-in. plain end pipe nipples with 1½ by 6-in. studs and hex nuts for the jack screws, are employed to true up fixture so that all work will be plumb and level. These jacks are placed as illustrated and are provided with ¾ by 6-in. diameter bearing plates which are welded to the 2½-in. pipe legs. Clamping vise for the fixed sheet end is attached to two ¾-in. plate brackets which are attached to the main frame by welding them to both I-beam sections. The bracket is coped to meet the contour of the cross member and is welded to its flange and web; it is welded also to the edge of flange on the longitudinal member. A 1-in. hex nut is welded to each bracket as indicated for carrying the leveling screws which support the fixed tube sheet.

In placing a bundle on the fixture its baffles and floating sheet rest on the edges of the upturned flanges of the longitudinal I-beam member with its fixed-end tube sheet overhanging into the clamp as illustrated by the drawing. The hookbolts hold the floating sheet of the bundle in position when their hooked end is placed into a tube hole and their nuts tightened snugly.



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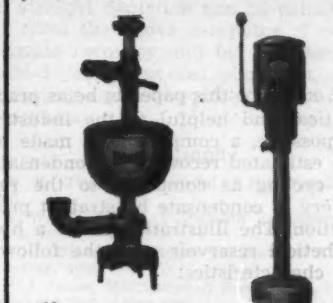

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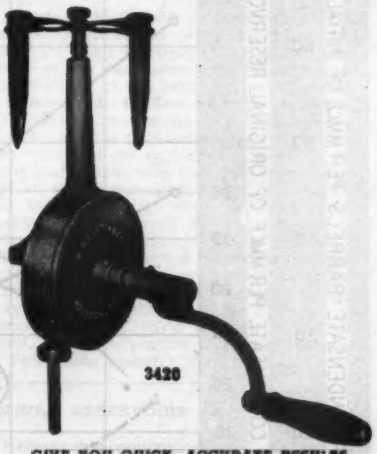

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Valuation of Gas-Condensate Reservoirs for Cycling

*by William H. Justice**

IN order for this paper to be as practical and helpful to the industry as possible, a comparison is made of the estimated recovery of condensate by cycling as compared to the recovery of condensate by straight production. The illustration is for a hypothetical reservoir with the following characteristics:

FIELD DATA

Number of producing acres in field	19,250
Average thickness of net productive sand, ft.	27
Total acre-feet of productive sand	519,750
Porosity, per cent	25.0
Permeability, md.	3,000 max.-600 min.
Bottom-hole pressure, psia.	4,400
Bottom-hole temperature, °F.	220
Estimated connate water, per cent	30
Deviation factor of gas	0.91
Porosity and permeability of sand is	Uniform
Open-flow potential of wells, M.M.c.f. per day	70

*Tide Water Associated Oil Co., Houston.

IN the presentation of this subject at the A.I.M.E. joint meeting of all Texas sections at University of Texas, December 18-19, in gas-condensate evaluation the author outlined the importance of the physical properties of the reservoir and reservoir fluids, the field reserves, the extent of possible natural water drive, and discussed retrograde losses and differences in recoveries obtained in field separators and by modern recovery plants. Also included was an illustration of a method of estimating condensate recoveries by cycling and by straight production (pressure depletion) and the following article is limited to this latter portion of the paper.

ESTIMATE OF GAS RESERVES IN PLACE

Initial volume of gas in place per acre-foot:

$$Vi = 43{,}560 \frac{p\ Pr\ Tr\ S}{Pb\ Ts\ Zr}$$

$$Vi = 43{,}560 \times \frac{0.25 \times 4{,}400 \times 520 \times 0.70}{14.64 \times 680 \times 0.91}$$

$$= 1{,}924{,}000 \text{ cu. ft.}$$

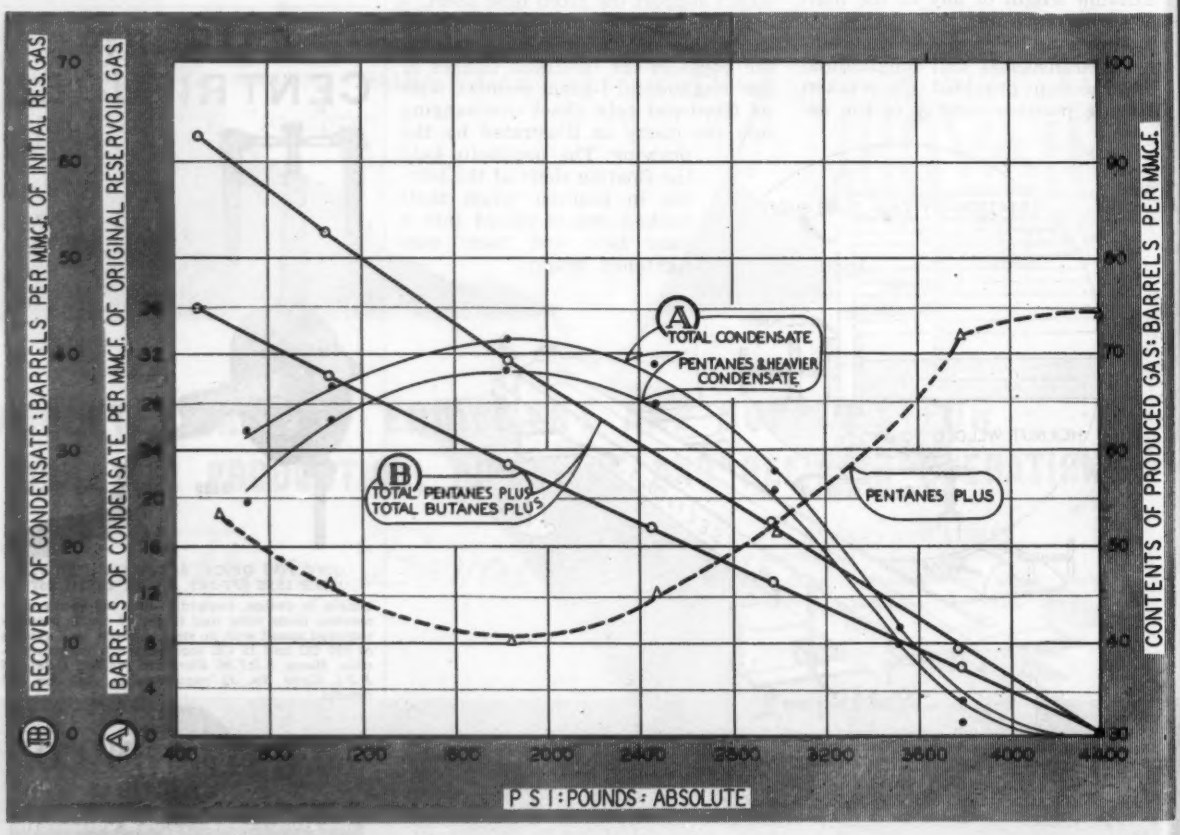
Initial volume of gas in place in field:

519,750 ac.-ft. × 1,924 M.c.f.
= 1,000,000,000 M.c.f. of gas

Estimate of Recoverable Condensate by (1) Cycling and (2) Straight Production

It has been found by experience that approximately 70 to 80 per cent

Plotted here against reservoir pressure (psia.) are: (A) Accumulation of retrograde liquid (total condensate, and pentanes and heavier condensate) during pressure depletion of 220° F.; (B) cumulative recovery of condensate (total butanes plus, and total pentanes plus) by straight pressure depletion of reservoir temperature 220° F. Also, the dashed curve is a plot of the content (pentanes plus) of produced gas at various reservoir pressures, temperature 220° F.



RESERVOIR FLUID DATA

Component—	Separator gas, Mol %	Separator liquid Mol. %	Separator liquid Liquid %	Reservoir gas Mol %*	Reservoir gas G.p.m.	Reservoir gas Bbl./ M.M.c.f.
Carbon dioxide	1.00	....	....	90	....	....
Methane	85.24	12.65	5.31	78.05	....	....
Ethane	7.44	7.35	4.33	7 42	....	....
Propane	4.02	12.65	8.60	4.86	....	....
Isobutane	.71	5.54	4 48	1.18	0.391	9.3
n-Butane	.82	9.16	7.15	1.65	0.519	12.4
Isopentane	.22	5.54	5.02	.75	0.274	6.5
n-Pentane	.15	4.70	4.21	.60	0.217	5.2
Hexanes	.21	8.55	8.71	1.04	0.426	10.1
Heptanes plus†	.19	33.86	52.19	3.53	2.126	50.6
Total	100.00	100.00	100.00	100.00	3.04 C_4+	72.45 C_5+

*Calculated from separator liquid and gas analysis using actual liquid gas ratio. †Properties of the heptanes plus residue from separator liquid analysis are: Engler distillation (initial boiling point, 240° F.; end point, 615° F.; recovery, 95.5; residue, 3.3 per cent); specific gravity, 0.7936; molecular weight, 144.

of the original gas in place in the reservoir can be recovered while cycling. The recovery can be accomplished with an average pressure drop equivalent to 10 per cent of the original reservoir pressure or 440 psi. This pressure drop is the result of the removal of liquid hydrocarbons from the gas as well as the gas consumed as engine and boiler fuel in the cycling plant. From the retrograde curve ("A" in figure) the estimated loss of condensate (pentanes and heavier) is estimated at 0.5 bbl. per million for the 440 psi. pressure drop.

The estimated recovery of condensate from the gas processed during cycling is estimated as 72.5 — 0.5 = 72 bbl. of pentanes plus per million cubic feet of original reservoir gas. The cumulative recovery of condensate in the uncycled portion of the field which will be recovered by pressure depletion after the cycling program is ("B" in figure) 44.2 bbl. per million cubic feet of initial reservoir gas. The total recovery of condensate by cycling and subsequent depletion is estimated as 72 bbl. × 70 per cent + 44.2 bbl. × 30 per cent = 63.6 bbl. of pentane plus or 87.8 per cent of the condensate in the original reservoir gas. The total recovery of condensate from this field by cycling and subsequent depletion is estimated as 1,000,000 M.M.c.f. × 63.6 bbl./M.M.c.f. = 63,600,000 bbl. of pentanes and heavier condensate.

The estimated retrograde loss of condensate in the reservoir at 220° F. at various reservoir pressures is shown ("A" in figure). Estimated cumulative recovery of condensate by straight pressure depletion ("B" in figure) is 44.2 bbl. per M.M.c.f. or 61 per cent of the pentanes and heavier condensate in the original reservoir gas. The total recovery from the field by straight depletion is estimated as 1,000,000 M.M.c.f. × 44.2 bbl./M.M.c.f. = 44,200,000 bbl. of pentanes and heavier condensate.

The estimated recovery of pentanes and heavier condensate from this field by cycling and subsequent depletion is 19,400,000 bbl. greater than by straight depletion of the reservoir. Of additional economic importance is the difference in rate of recovery of condensate by cycling as compared to the rate of recovery by straight depletion. With an assumed cycling rate of 200 M.M.c.f. per day 80 per cent of the recoverable condensate will be recovered in the 14-year cycling life of the field. The present worth of the condensate recovered during the cycling period is considerably more than the present worth of condensate to be recovered during the long depletion period of the reservoir.

As previously mentioned the cycling plant is usually equipped to recover at least 80 per cent of the butanes and from 30 to 60 per cent of the propanes in the produced gas. Usually it is uneconomical to install an efficient recovery plant to process gas from reservoirs produced for direct sale to a pipe-line market because of the wide variations in daily demand. The sales gas is usually processed through a high-pressure separator which recovers a volume of condensate equivalent to approximately the pentanes plus content of the gas. Thus the actual salable recovery of condensate, butanes, propanes from the reservoir by cycling is usually greater than the difference shown in the above calculation. The above estimated recovery of condensate and butane from this hypothetical reservoir is summarized in Table 1.

A comparison of the net income that can be realized from the production of the reservoir by cycling or straight depletion can be calculated from the above estimates of condensate recovery and by considering field-development cost, plant cost, and operating expense required by the two programs.

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BOOKS

OIL FOR VICTORY. By the editors of Look. 287 pp. $3.50.

This is a well-documented history of the petroleum industry's role in World War II. Three thousand copies are being distributed, gratis, by the American Petroleum Institute. Commencing with a graphic presentation, in words and pictures, of the battle east of the Rhine, the editors have described the vital role played by oil and oil men, from the days before Pearl Harbor, down to V-J Day.

The reader learns how the Netherlands East Indies Sumatra oil installations, whose prewar value was about $35,000,000, were blown to bits by a group headed by L. W. Elliott, now president of Standard-Vacuum Oil Co. The installations were destroyed to prevent them from falling into Japanese hands.

America, "Fuel Tank of Democracy," and her South American allies are given full credit for their wartime oil activities, with names of the more prominent oil men mentioned freely in the text. The wartime importance of Middle East oil is also recorded.

In addition to serving as a wartime history of oil, this publication apparently was also designed to convey to readers, entirely unfamiliar with the petroleum industry, an impression of the vast oil reserves and the methods of development. Considerable space is given to the miracles of petroleum chemistry.

Look's editorial board of review for this publication consisted of Robert E. Allen, A.P.I. public-relations director; George Freyermuth, public-relations director of Standard Oil Co. (New Jersey), and Allen Hand, former executive secretary-treasurer of Petroleum Industry War Council.

TABLE 1—ESTIMATED RECOVERY OF CONDENSATE FROM HYPOTHETICAL RESERVOIRS

Components—	Hydrocarbons originally present in reservoir: Bbl. per M.M.c.f. of original reservoir gas	Hydrocarbons originally present in reservoir: Bbl. from total reservoir*	Hydrocarbons originally present in reservoir: Per cent of original	Recoverable condensate: Cycling with subsequent pressure depletion to 500 lb.†: Bbl. per M.M.c.f. of original reservoir gas	Recoverable condensate: Cycling with subsequent pressure depletion to 500 lb.†: Bbl. from total reservoir	Recoverable condensate: Cycling with subsequent pressure depletion to 500 lb.†: Per cent of original	Recoverable condensate: By straight pressure depletion to 500 lb.: Bbl. per M.M.c.f. of original reservoir gas	Recoverable condensate: By straight pressure depletion to 500 lb.: Bbl. from total reservoir	Recoverable condensate: By straight pressure depletion to 500 lb.: Per cent of original
Pentanes and heavier	72.5	72,500,000	100.0	63.5	63,500,000	87.8	44.2	44,200,000	61.0
Butanes and heavier	81.7	81,700,000	100.0	76.6	76,600,000	93.8	62.0	62,000,000	75.8

*Assuming the reservoir originally contained 1 trillion cubic feet of gas. †Assuming 70 per cent of the gas originally in place is recoverable by cycling with a pressure drop of 10 per cent.

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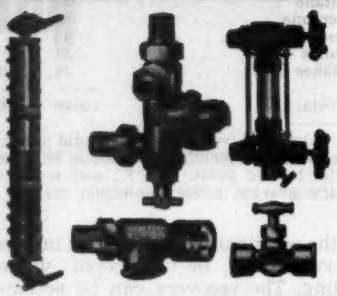

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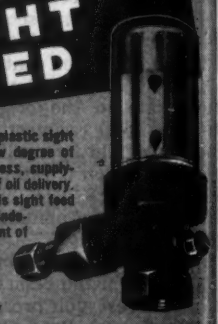

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modern Rotary drilling

1. Introduction

The purpose of the series starting here is to review the rotary method of drilling from the point of view of its modern problems. Emphasis will be placed primarily on the manner in which operators, drilling contractors, equipment manufacturers, and technical service companies are meeting these problems. Older well-known practices, equipment, and methods will be touched upon very briefly, only insofar as it is necessary to create the background for discussion.

Extent of Application

DURING September 1946 there were in this country, in active operation, 1,697 rotary rigs and some 1,200 cable-tool rigs. This means that of all the rigs actually drilling, around 60 per cent were rotary rigs.[1] Of 26,879 wells completed in this country during 1945, 18,037 wells, or approximately 67 per cent, were drilled with rotary.[2]

The 8,842 wells completed during 1945 with cable tools are represented primarily by shallow wells, drilled in states which contribute only a small portion of the total production of the country. For instance, 6,885 wells, or about 77 per cent of the total, were completed in four states of New York, Ohio, Pennsylvania, and West Virginia. Production, during 1945, of these four states was only 1.31 per cent of the national production.

Cable-tool drilling is confined to areas with certain specific characteristics, while rotary drilling is finding its application in practically all the oil-producing areas. The geographical distribution of the above-mentioned 1,697 rotary rigs, in active operation during September 1946, was as follows: Texas-Louisiana Gulf Coast, 460; West Texas-New Mexico, 275; Oklahoma-Kansas, 275; Arkansas-North Louisiana-East Texas, 160; North Texas, 140; Pacific Coast, 140; Rocky Mountain area, 135; Illinois basin, 112.

Exact figures are difficult to secure. It is believed, however, that of the total of over 93 million feet drilled in this country during 1945, around 88 per cent, or some 83 million feet, were drilled with rotary.

Considering the variety of drilling conditions encountered in drilling such a large footage under such diversified geographical distribution, it is not difficult to arrive at the conclusion that, from the mechanical point of view, the rotary method of drilling is now universally applicable.

Obvious advantages of rotary over cable-tool method of drilling, such as speed of drilling, saving of casing, and ability to control gas and water contained within the formations penetrated by the hole, encouraged research having as its purpose broader development of the method. New tools, new equipment, new methods and processes were perfected. New materials were used in manufacture of tools and machinery. The result is the present position of rotary as a leading oil-well-drilling method.

History

Some of the basic principles of rotary drilling were applied to search for oil as early as 1866.[3] The method as such, however, was originally designed for and was used in drilling water wells. Two brothers, M. C. and C. E. Baker, perfected and used this method for drilling of water wells in Dakota Territory about 1882.

There are records of use of rotary rigs in drilling for oil during the subsequent years. Real beginning, however, of extensive application of rotary method of drilling of oil wells dates back to the discovery in North Texas of the Corsicana field in October 1895. The Baker brothers moved to the field with their equipment and American Well & Prospecting Co. started building and developing rotary rigs. Water was used as circulating medium. Rotary mud was used first in drilling and completing in January 1901, on the Lucas gusher, discovery well of the Spindletop field, Texas.

Present Problems

During the 50 years of evolution of the rotary method of drilling, many problems were met and solved. These solutions are now a well-known routine. In recent years, however, an entirely new set of questions resulting from the urgent need for economies and from the ever-increasing depth of the wells drilled has been presented.

Need for economies.—With the cost of labor, materials, and services increasing entirely out of proportion to the increase in the value of oil sold, economies and increased efficiency of drilling operations became imperative.

Increasing depth.—Average depth of wells completed in this country during 1945 was 3,469 ft.[2] This average figure, resulting from the effect of the large number of shallow wells drilled, is of value only as an indication of the trend. During the preceding year the average depth of completions was 3,234 ft. Actually in the important producing areas of the country this average depth is considerably above the national average.

The increasing size and weight of the equipment, brought about by the increasing drilling depth, points toward need for more automatic operation of the component parts of the rotary rig. This is necessary if drilling efficiencies are to be maintained. Heavy equipment poses also the problem of efficient moving and rigging up.

With increased drilling depth new problems of pressures, temperatures, and well conditions are met, and must be solved.

Present economic problems of all the drilling operations have already been referred to. Drilling of deep wells has economic problems of its own. Data on recent trends of drilling costs indicate that for the depths below 7,000 to 8,000 ft., drilling costs increase entirely out of proportion to the increase in depth.[4] For instance, figures on 160 wells, drilled in soft formations of Texas, Louisiana, and New Mexico show that the average drilling cost per foot of a 15,000-ft. well is around five times that for an 8,000-ft. well. Data on 23 wells, drilled in hard formations of West Texas and New Mexico, show that the average drilling cost per foot of a 14,000-ft. well is more than three times that of a 7,000-ft. well. This is a condition which calls for a fundamental improvement in equipment and methods if drilling of very deep wells is to be economically justified.

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2. The Oil and Gas Journal, January 26, 1946.
3. C. A. Warner: "Texas Oil and Gas Since 1543," Gulf Publishing Co.
4. Douglas Ragland: "Drilling Equipment Needs," a paper presented before American Association of Oil Well Drilling Contractors, Oklahoma City, October 2, 1945.

No. 1 in a series by Joseph Zaba, petroleum engineer, Houston

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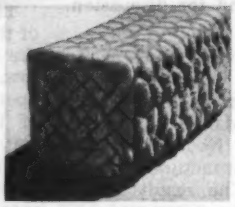
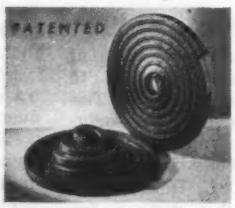


Cross section, showing unique structural design.



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The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Losses Through Heated Walls

LOSS of heat by conduction through flat walls or surfaces may be computed from:

$$\frac{\text{B.t.u.}}{\text{sq. ft.-hr.}} = \frac{t_1 - t_2}{\frac{1}{h_1} + \frac{L_2}{K_2} + \frac{L_3}{K_3} \text{ etc.}}$$

in which:

t_1 = hot surface, °F.
t_2 = air, °F.
L_2, L_3, etc. = thickness of various wall materials, ft.
K_2, K_3, etc. = thermal conductivity of various materials per foot thickness (see Notebook No. 124, December 21)
h_1 = film coefficient for air film (radiation and convection)

The air-film coefficient (h_1) is of little significance for well-insulated surfaces or for very thick walls but for bare metal surfaces or thinly covered ones the film coefficient may constitute the main insulating medium. Unfortunately the film coefficient is dependent on the temperature of the surface in contact with the air, on the air velocity, and on the position of the surface (vertical, horizontal, upper or lower, or sloping). None of these factors is easily known. The most troublesome factor is the temperature difference between the wall and the air, but the difficulty of this trial-and-error computation can be eased by the use of Fig. 1. This figure is based on all types of surfaces — metal, wood, canvas, painted, etc. The position of the surface has some effect and the following factors are recommended:

Vertical	1.0
Horizontal, under side	0.70
45° slope, under side	0.85
45° slope, upper side	1.15
Horizontal, upper side	1.30

On this same basis, a factor of about 0.8 should be used for horizontal pipe, and a factor of about 0.95 for vertical pipe.

The temperature of the outside of wall (t_w) can be estimated from:

$$t_w = t_2 + \frac{(t_1 - t_2)}{h_1\left(\frac{1}{h_1} + \frac{L_2}{K_2} + \frac{L_3}{K_3} \text{ etc.}\right)}$$

A value of t_w can be selected from whence h_1 can be read from Fig. 1. If the assumed value of t_w was wrong (according to the above equation) then new values must be selected until the assumed and computed values check.

Example.—Furnace gases are at 1,600° F. and on the outside is a 20-m.p.h. wind at 65° F. The wall consists of 9-in. fire brick, 4½-in. molded insulation brick, 4½-in. red brick and a ⅛-in. steel sheet for protection. Using following subscripts:

1—air film
2—steel
3—red brick
4—insulation
5—fire brick

The B.t.u. lost per hour through a square foot is:

$$= \frac{t_1 - t_2}{\frac{1}{h_1} + \frac{L_2}{K_2} + \frac{L_3}{K_3} + \frac{L_4}{K_4} + \frac{L_5}{K_5}}$$

$$= \frac{1{,}600 - 65}{\frac{1}{h_1} + \frac{.125}{12 \times 29} + \frac{4.5}{12 \times .4} + \frac{4.5}{12 \times .125} + \frac{9}{12 \times .76}}$$

$$= \frac{1{,}535}{\frac{1}{h_1} + (\ldots) + .93 + 3.0 + 1.0} = \frac{1{,}535}{\frac{1}{h_1} + 4.93}$$

If the outside wall temperature is 200° F., the value of h_1 from Fig. 1 is 5.8 because $t_w - t_2$ is 135° F. The computed wall temperature is:

$$t_w = 65 + \frac{1{,}535}{5.8\left(\frac{1}{5.8} + 4.93\right)}$$

$$= 65 + 52 = 117° \text{ F.}$$

Obviously the wall was not at 200° F. but near to 117° F. — try 120° F.

$$t_w = 65 + \frac{1{,}535}{5.2\left(\frac{1}{5.2} + 4.93\right)}$$

$$= 122° \text{ F.}$$

The B.t.u. loss per square foot per hour will then be:

$$\text{B.t.u.} = \frac{1{,}535}{\frac{1}{5.2} + 4.93} = 299$$

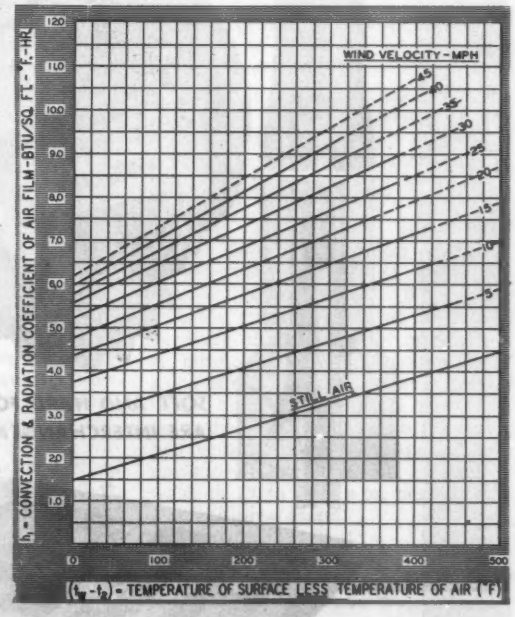
WIND VELOCITY - MPH
STILL AIR
h_1 = CONVECTION & RADIATION COEFFICIENT OF AIR FILM - BTU/SQ. FT. - °F. - HR.
$(t_w - t_2)$ = TEMPERATURE OF SURFACE LESS TEMPERATURE OF AIR (°F)

Fig. 1—Combination convection and radiation film coefficient for air in contact with vertical walls or surfaces

No. 125 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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Filtration of Water

FILTRATION is employed in the treatment of water to remove any suspended matter from the water so as to render it relatively free from turbidity. The process of filtration is essentially mechanical, although if coagulation is employed, accurate chemical control is necessary to obtain consistently optimum results.

In the practical sense of the word, filtration in no way effects removal of dissolved solids such as organic material in solution, dispersed oil, sodium chloride, calcium bicarbonate, etc.

Theory Involved

The phenomenon of filtration is due essentially to two physical actions: Straining or screening, and frictional resistance.

Suspended matter of a size too large to pass through the small spaces between the porous grains of the filtering medium is retained by a straining or screening action. Suspended matter of a small size capable of passing through the small spaces between the porous screen is retained by frictional resistance. This frictional resistance occurs primarily after the filtering surface becomes coated or impregnated by suspended matter of the larger particle size. When the larger particles collect on the filtering surface, a mat or layer of suspended matter accumulates, which in itself acts as a type of filtering material on top of the filtering surface. Very small particles of suspended matter, colloidal in dimension and too small to be removed by straining or frictional resistance, may be coagulated by pretreatment to suitable size for efficient filtration.

The porous material employed to retain this suspended matter while permitting the water to pass through is usually referred to as the "filter medium." Theoretically, the top surface of the filter medium performs the separation of the solids from the liquid and in practice it is assumed that none of the solids penetrate beyond a depth of 6 in. in the filtering medium. If maximum over-all efficiency is desired, it is necessary that a satisfactory filter medium be selected, properly sized or graded, and adequately supported in a correct and approved position specifically suitable for the filtration problem at hand.

Equipment Employed

Industrial filtration employed in water conditioning can be broadly divided into three general classifications dependent on the type of equipment.

Gravity filters.
Pressure filters (a) vertical, (b) horizontal.
Disk filters.

Gravity filters. — As the name implies, the flow of water through these filters is effected by gravity. The bed is always graded and ranges successively from "coarse" supporting medium on the bottom adjacent to the collecting system, to "fine" filtering-medium on top.

Pressure filters.—The comparative design of pressure filters is essentially the same as that of gravity filters. The principles of construction, operation, and the desirable appurtenances are similar. The primary difference is that pressure filters may be inserted in water lines to operate under a given pressure while the gravity filters operate under gravity. The bed of the pressure filter, possessing the same characteristics as that of a gravity filter, is placed in a cast iron or steel "shell" designed to withstand a given pressure. Two general types of pressure filters are manufactured. The horizontal filter, ranging from 8 to 10 ft. in diameter and 10 to 25 ft. long, is employed for comparatively large water flows. The diameter of vertical filters varies from 12 in. to 10 ft. (12 ft. maximum) with the height dependent on the character and depth of the filter bed. The general trend is away from horizontal-type pressure filters.

Pressure filters may be operated at rates of flow comparable to rapid gravity filters, although normally the rate should not exceed 3 gal. per sq. ft. of filter area per minute.

Disk filters. — Disk filtration, sometimes referred to as "fine filtration," is usually secondary to other means of filtration and is normally employed for special purposes—sometimes merely as a double check to insure water absolutely free of suspended matter at all times. Water from other clarification processes is filtered a second time in a variety of equipment employing such different filtering mediums as asbestos, cloth, fiberglass, paper, porcelain, carborundum, etc.

The filter medium.—Many materials are utilized for the filter medium in the process of water filtration: sand, anthracite, coal, coke, carbon, charcoal, excelsior, marble (calcium carbonate), magnetite (magnetic iron oxide), canvas, terry cloth, marine and terrestrial sponges, slag, porous plates, or tubes of various materials, etc. Certain rates of flows are specified for these installations as follows:

Potable water supplies, such as drinking water—2 gal. per sq. ft. of filtering area per minute.

Filtering water of approved bacterial purity or make-up for boiler feed-water or industrial purposes—2 to 3 gal. per sq. ft. of filtering area per minute.

After the filter is in service, the filtering surface becomes coated to a greater or lesser degree with suspended matter and the flow of water through the filter is materially decreased thereby. The process of cleaning accumulated suspended matter from the filtering surface by reversing the flow of water is termed backwashing. Wherever possible, filtered water at the temperature of normal filter operation is employed. Passing water upward through the filter at a relatively high velocity with or without other means of agitating the bed is more commonly applied to pressure filters. The rate of backwash is 12 to 15 g.p.m. per sq. ft. filtering area (sand).

This material is from the Betz Handbook for Industrial Water Conditioning, written and published by W. H. and L. D. Betz, consulting engineers, Philadelphia.

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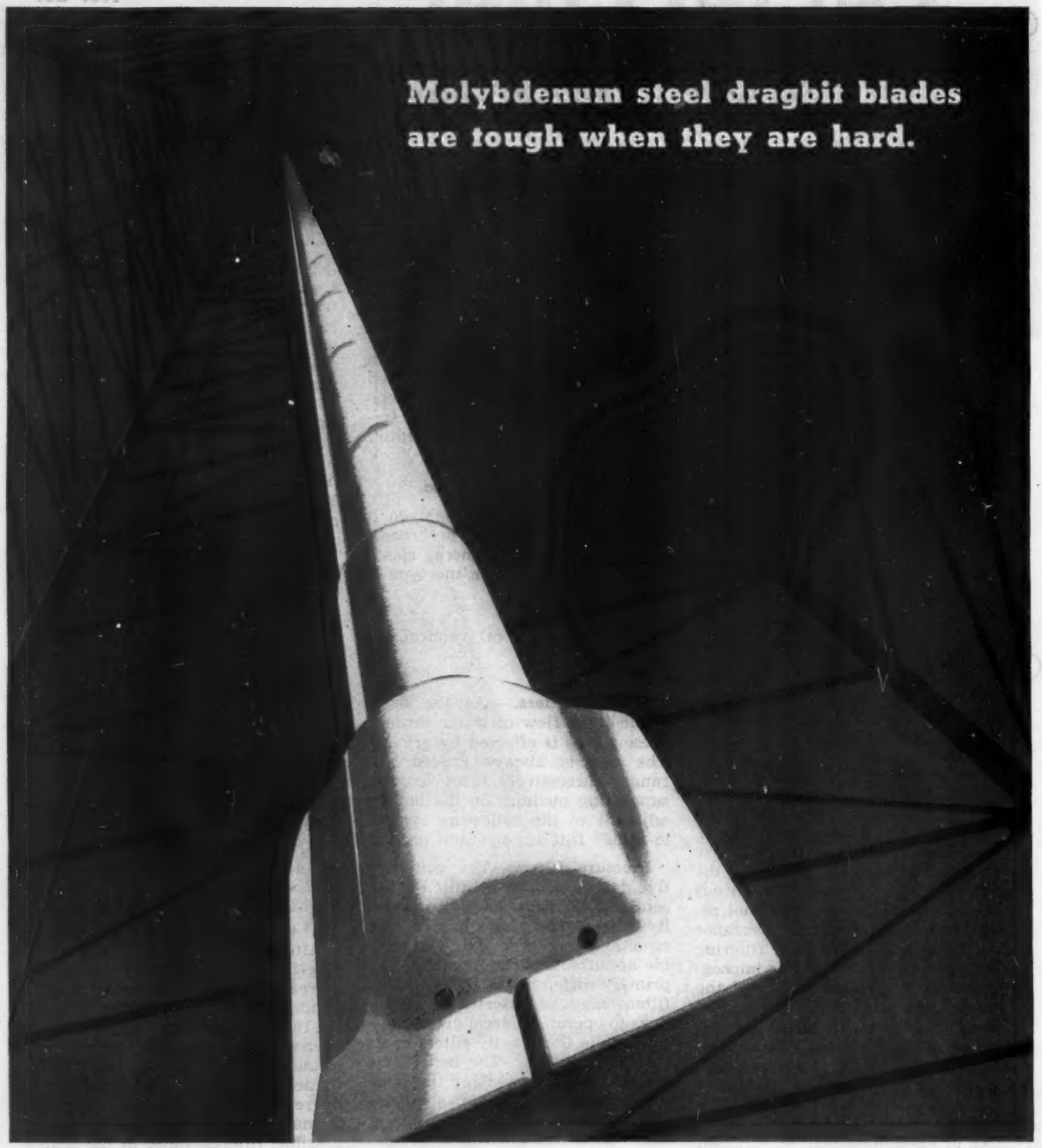

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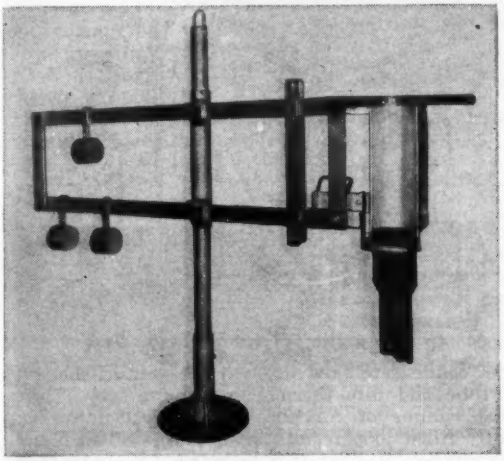
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

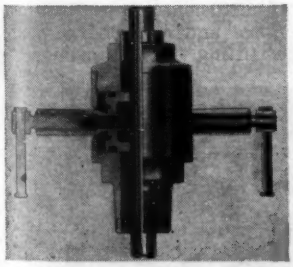
by John M. Spears

(1) SAFETY DRILL-PIPE STABBER eliminates hazards to men and equipment in handling drill pipe on rig floor. Gives positive alignment for each "stab." Stabber is



quickly swung into position for the stab and then swung away in the clear for making up joint. Unit, designed for "finger board" jobs, is easily and quickly installed on any rig. Stops chaffing and shearing of threads. Reduces down time and maintenance on tool joints. *Ben F. Kelly Co.*

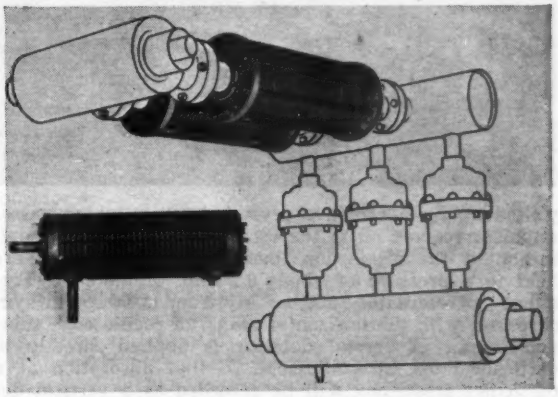
IT'S NEW CHECK IT



(2) POLISHED-ROD STUFFING BOX provides floating gland for true self-alignment of rods. Self-lubricated plastic packing maintains fluid and pressure seal around polished rod. Gland, which "floats" with the rod, seats on a shoulder inside a housing and is held in position vertically by a threaded cap screwed in top of housing. O-rings in gland effect a pressure seal between gland and housing. Plastic guns, threaded into gland, extend through housing and permit plastic to be inserted, tightened, and added as necessary without shutting in well. Plastic guns are not connected to the housing. A bronze wear bushing, screwed in top of cap, limits lateral movement of rod, preventing contact with tubing and fittings, and eliminating wear on gland. *Kinzbach Tool Co., Inc.*

IT'S NEW CHECK IT

(3) COMPRESSED-AIR ARIDIZER offers the principle of heat transfer for heating both air and gases, as well as for superheating steam. Temperatures up to 1,000° F. can be maintained. Heating of compressed air for drying and dehydrating is made possible by bilateral fin de-



sign. Heating may be effected by electric calrods, oil, or gas-burning equipment. If element being heated is contaminated by suspended foreign particles, Turbo-Rotor Pur-O-Fiers are assembled as an integral part of the unit to purify the processing element before entering Aridizer. *Goodyer Industries, Inc.*

IT'S NEW CHECK IT

(4) MICROWAVE SPECTROSCOPE, for analysis of chemical substances, uses radar waves from 1.2 to 1.6

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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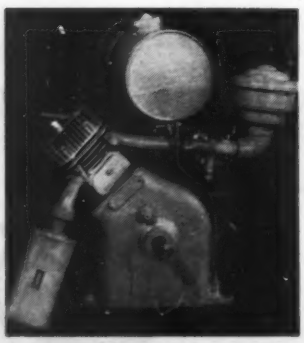
cm. in length. Identifies the more complicated molecules such as hydrocarbons without laborious chemical processes. Basic elements are an oscillator or radar tube, waveguide, crystal detector, oscilloscope, and sweep generator. Microwaves emitted by oscillator tube are directed through a rectangular waveguide which contains sample gas or vapor to be analyzed in a gas cell section that is sealed off with plastic tape. At far end they are

picked up by a sensitive crystal detector which passes impulse received on to the oscilloscope. For clearer definition of the absorption lines, vapors in gas cell are held to a pressure of about 0.1 mm. of mercury. Frequency of oscillator tube, or klystron, is swept in synchronism with the horizontal sweep of oscilloscope tube, and output of crystal detector is applied directly to vertical plates of oscilloscope so that absorption at a particular frequency will be recorded as a vertical deflection of the oscilloscope trace. *Westinghouse Electric Corp.*

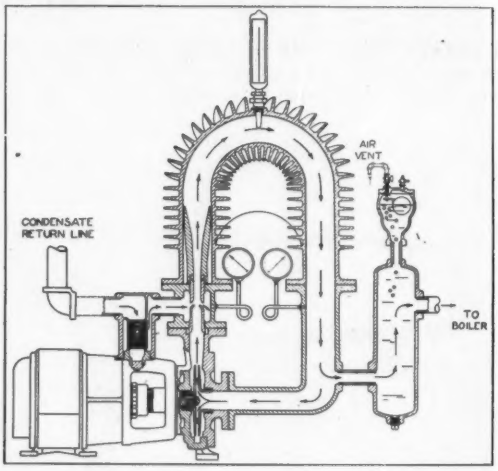
IT'S NEW CHECK IT



(5) NEW "4-PLUS" ENGINE is an air-cooled, single-cylinder gasoline engine with integral half-speed drive that permits full horsepower output at one-half normal crankshaft speed. In standard crankcase is a clutch and reverse-gear assembly for convenient installation in various equipment without the necessity of supplementary transmission, reduction gears, clutches, and similar bulky accessories. Specifications include a multiple-baffle muffler, 1-in.-diameter drive shaft, a 14.2-in. displacement, Stromberg float-feed carburetor, and Bendix-Scintilla high-tension magneto. *Ellinwood Industries.*

IT'S NEW CHECK IT

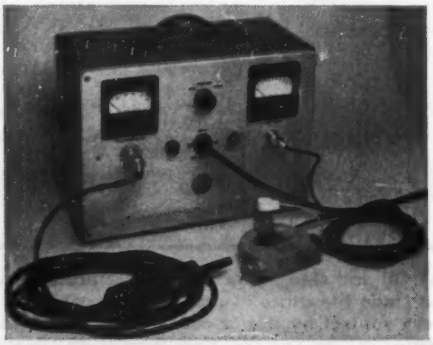
(6) CONDENSATE RETURN SYSTEM for high-pressure heating of refineries, plants, warehouses, etc., embodies a specially designed centrifugal pump which draws water from the thermo-fin priming loop and discharges it as a high-velocity jet through the jet-pump nozzle. This jet strikes the returned hot condensate and in-



duces condensate flow through the venturi-shaped mixing tube and into thermo-fin priming loop. The additional volume of condensate introduced into the constantly filled loop results in discharge of an equal volume through air separator to boiler. The hot condensate and entrained air are drawn rapidly and positively from heating coils by the jet pump. Air is eliminated from circuit by passing through the air separator, and the condensate is returned to boiler at maximum temperature and pressure. *Cochrane Corp.*

IT'S NEW CHECK IT

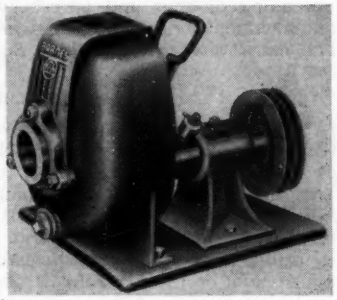
(7) NEW VACUUM GAGE measures gas pressure by electronics for use in vacuum systems in which rotary pumps are used to back oil-diffusion pumps. Unit incorporates a thermocouple gage and a discharge gage, which have standard pipe fitting for connection to



vacuum system. Thermocouple gage for higher-pressure measurements provides circuit flexibility by octal base type of connection. Discharge gage is the cold-cathode, diode type of ionization gage and gives cur-

rent indications for reduced pressures as low as 0.1 micron. A permanent magnet surrounding tube in oval-metal shell produces a strong magnetic field along the minor diameter of shell, establishing it as the cathode of gage. Anode consists of a rectangular loop of wire, embracing the maximum position of magnetic field. *Radio Corp. of America.*

IT'S NEW CHECK IT



(8) UNIVERSAL DRIVE PUMP has 1½-in. discharge with a capacity up to 5,700 g.p.m. Pump is centrifugal type, and can be driven from any available power source. Equipped with heavy-duty coupling head, incorporating double ball bearings. Shaft, made of polished, case-hardened steel, is mounted on ball bearings to carry radial load. *Barnes Manufacturing Co.*

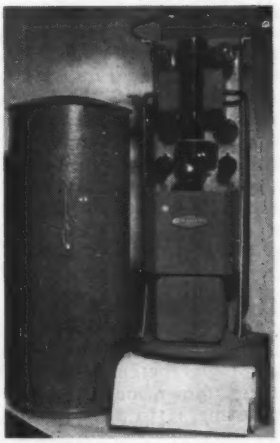
IT'S NEW CHECK IT

(9) PORTABLE LEAK DETECTOR locates and measures leaks in vacuum and pressure systems as minute as .00000001 cc. per second. Based on the mass spectrometer principle, instrument electronically separates and measures helium molecules, by reason of their mass, from all dissimilar molecules in atmosphere. Size of the leak can also be determined with the audio system when using a helium probe at a distance from the instrument. Pitch of leakage-warning signal changes roughly in proportion to leak size. Instrument is completely portable, has only a few connections and adjustments, and can be operated by an inexperienced person. Operates from a standard 115-volt, 60-cycle lighting circuit. *Consolidated Engineering Corp.*

IT'S NEW CHECK IT

(10) NEW NEEDLE VALVE for gage, metering, instrument, test, bleeder, and other high-temperature, high-pressure, corrosive line services. Union nut construction prevents dangerous blowouts during opening or repacking and also provides deep stuffing box. Positive back seating allows valve to be safely repacked under full-line pressure. A metal-to-metal line seal at the bonnet eliminates use of gaskets. Full port clearance prevents interference with flow characteristics by nipples. Combines positive shutoff with micrometer throttling action. Ball seat has a tapered tip, actuated by fine-stem threads, which permits control of flow and ease of operation at all pressures. Stainless steel construction. *Kerotest Manufacturing Co.*

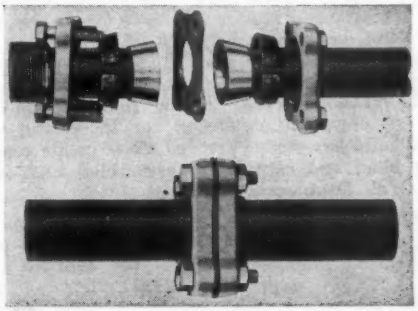
IT'S NEW CHECK IT



(11) STRAY CURRENT CONTROL SYSTEM prevents damaging effects caused by electrolytic action on oil, gas, and water underground-pipe installations. Electrolysis occurs when stray current in pipe lines seeks to escape through surrounding soil, and in so doing touches off a reaction in which metal from the pipe is removed. Control system comprises a current and voltage-sensitive device, operating jointly on a high-current contactor. Contactor is activated by the current and voltage-sensitive device, functioning of which depends on the amount of current or potential present in the pipe. Contactor will prevent the system from becoming a back path for more stray current, which if permitted to flow uncontrolled will result in further electrolysis of the pipe. *Cook Research Laboratories.*

IT'S NEW CHECK IT

(12) STAINLESS-TUBING FITTINGS are applicable wherever liquid conveying lines require corrosion-resistant properties. Line of ells, tees, crosses, return bends, "Y's," laterals, ferrules, reducers, and adapters is used



with commercial-tolerance stainless-steel tubing having outside diameters of 1 to 4 in. All fittings can be readily adapted to a variety of other fitting and valve types, including conical-glass tubing, iron pipe-size fittings, and welding fittings. Flanged coupling (illustrated) in aluminum or stainless steel is designed to provide simplified installation of these new fittings. *Tri-Clover Machine Co.*

IT'S NEW CHECK IT

TRADE LITERATURE

(13) INFRARED SPECTROPHOTOMETER described and illustrated in 10-page bulletin. Treats design, construction, and performance. Shows attachments of synchronous-motor wave-length drive, amplifier, recorder, gas-handling system and constant temperature bath. *National Technical Laboratories.*

IT'S NEW ✓ CHECK IT

(14) ENGINE CONTROLS. Small pocket-size booklet lists complete line of automatic and semiautomatic engine controls. Of interest to manufacturers, operators and owners of internal combustion engines of all types. *Synchro-Start Products.*

IT'S NEW ✓ CHECK IT

(15) FLOATING AND GUIDING EQUIPMENT. Two-color bulletin treats equipment used in solving cementing problems. Cutaway figures with description covers shoes, collars, casing centralizers, tubing heads, hangars, slips, clamps, and plugs. Features operation of Cementrol equipment. *Larkin Packer Co., Inc.*

IT'S NEW ✓ CHECK IT

(16) CONDENSER TUBES. A 15-page, illustrated bulletin describes various types of condenser tubes and their uses. Helpful tables and supporting data cover alloys available for condenser-tube use, safety working pressures, dimension and weight tolerances, and estimating data for ⅝ to 2-in. tube diameters. Also covers Tufrin, an integral finned tube. *Wolverine Tube Division, Calumet and Hecla Consolidated Copper Co.*

IT'S NEW ✓ CHECK IT

(17) RUSTRUM. New pocket-size booklet presents application directions and emphasizes antirust paint can be applied directly over rusty surfaces without brushing or scraping. Lists representative uses. *Speco, Inc.*

IT'S NEW ✓ CHECK IT

(18) ENGINE GENERATORS. Colored bulletin presents gasoline, gas, and diesel-engine generators equipped with power control system. Photographs show units, installations, and final test procedure. *The Ready-Power Co.*

IT'S NEW ✓ CHECK IT

(19) OIL WELL SERVICE. Folder features the "Patten Process" of chemical expansion for increasing production in oil and gas wells. Figures show inside mechanics of firing head and completely assembled high-pressure gun. *Oil Well Engineering Co.*

IT'S NEW ✓ CHECK IT

(20) CHEMICAL SERVICE. Folder describes chemical service to the oil industry. Acidizing, electric pilot, and plastic service are explained and illustrated. Also tells how operating efficiency is restored through chemical scale removal. *Dowell, Inc.*

IT'S NEW ✓ CHECK IT

(21) SODA ASH. New 64-page bulletin contains chapters on the properties of Soda Ash, bulk shipments, storage, conveying and elevating, unloading of bulk, unloading of bags and barrels, weighing, proportioning and feeding devices, sampling and analysis, precautions, and conversion tables. *Solvay Sales Corp.*

IT'S NEW ✓ CHECK IT

(22) STAINLESS STEEL PIPE AND TUBING. New folder showing stainless steel pipe, tubing, and fittings contains a table of the chemical composition of most A.I.S.I. type numbers of stainless steels. Cross sectional view of new Ermeto fitting illustrates how a positive seal is formed without flaring, threading, welding or soldering of pipe or tubing. *John B. Astell & Co., Inc.*

IT'S NEW ✓ CHECK IT

(23) LIQUID SEPARATION. Illustrated folder describes a new equipment for complete phase separation of immiscible liquids. Contains photographs of unit, cross-section flow diagram, dimension drawings, a description of operation, and possible uses. *Sales Corp. of America.*

IT'S NEW ✓ CHECK IT

(24) MACHINABLE ARC WELDS. Four-page bulletin gives instructions for making machinable arc welds in gray iron castings. Includes current settings, arc manipulation, and preheating temperatures. Diagrams show how to avoid overheating of the castings in typical applications. *C. E. Phillips & Co.*

IT'S NEW ✓ CHECK IT

(25) DIESEL ENGINE COOLING SYSTEMS. New 20-page booklet will help solve many problems encountered in diesel-engine cooling. Illustrated with pictures, diagrams, and blueprints. Shows how water-jacket scale, overheating, breakdowns, and insurance rates can be reduced or eliminated. *Binks Manufacturing Co.*

IT'S NEW ✓ CHECK IT

(26) HOSE COUPLING HANDBOOK. Use of hose couplings and fittings is presented in pocket-size handbook planned to aid user of hose and hose couplings in reducing operating costs and increasing efficiency of his equipment. Information on care of hose and selection and installation of correct hose couplings included. *Hose Accessories Co.*

IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

NATURAL GAS

Occupation Tax on Gas Lines in Texas Sought

AUSTIN.—A proposal to place an occupation tax upon gas-transmission lines in Texas will be laid before the state legislature when it meets in March, Rep. C. S. McLellan, Eagle Lake, Tex., said here recently. The tax, he estimated, would produce between $30,000,000 and $50,000,000 annually.

McLellan said details of the bill have not been completely determined but that it would propose one-fourth of the revenue be allocated to schools and the remainder earmarked for a farm-to-market road program. Texas now levies a tax on gas of 5.2 per cent of its market value at the well. It produces about $4,000,000 annually. McLellan said Texas gas resources will be depleted within 20 to 50 years.

Kansas Commission Rules Against Republic Gas Co.

WICHITA, Kans.—The Kansas Corporation Commission last week published a ruling that the Republic Natural Gas Co. violated conservation rules in the Hugoton field of Kansas last April and May by controlling meters on 88 wells being put back into production.

The commission, however, accepted the company's production estimates and noted that it "has made correcting additional payments to the royalty and other interested owners." The commission found that Alfred Hurlburt, vice president, had directed the company's engineer, Steve Ford, to control the upstream valves on wells which had been shut in and were being placed back in production "to avoid blowing the mercury and damaging the meters." The commission ruled such an act was a violation of regulations "because the gas passing through the meter runs was not being measured accurately and the volume thereof recorded on the meter chart."

Natural-Gas Revenues Show 5.3 Per Cent Gain

Revenue from sales of natural gas during the third quarter of 1946 increased 5.3 per cent, according to the utility-gas sales report published by the American Gas Association.

Residential revenues gained 3.1 per cent, while commercial revenues climbed 6.5 per cent and sales of gas to industrial consumers rose 10 per cent. Total revenue from sales during the 3-month period was $131,200,000.

Helium Sales to Average 1,000,000 Cu. Ft. Monthly

GOVERNMENT sales of helium to commercial users in the United States are expected to average more than 1,000,000 cu. ft. monthly during the fiscal year 1947, the greatest volume of the gas ever used industrially, according to Dr. R. R. Sayers, director of the Bureau of Mines.

On the basis of distribution figures for the first 4 months of the fiscal year and new commercial contracts being negotiated for 1947 by the Bureau of Mines—sole producer of helium—the 1,000,000 cu. ft. a month industrial consumption will be surpassed easily, Dr. Sayers said. During October a new all-time record for sales to private users was established when 1,367,880 cu. ft. were distributed.

Contributing to the increased industrial demand has been the development of a satisfactory process for welding aluminum by helium-shielded arc welding. One of the major new contracts being negotiated for the coming year calls for the delivery by the bureau of 1,020,000 cu. ft. of helium—an average of 85,000 cu. ft. per month. This supply is to be sent to a western fabricator who plans to employ helium-shielded arc welding in welding aluminum.

Stainless steel has been added to the list of metals which show improved welds with helium-shielded arc welding and some increased demand for helium is anticipated from this industry, the bureau officials said. As with magnesium and aluminum, in the welding of stainless steel the helium atmosphere prevents the formation of harmful oxides and nitrides with components of the air.

Another peacetime industrial outlet for helium being produced has been the decommissioned blimps sold to private concerns and individuals by the U. S. Navy.

Industrial users, as well as federal agencies and scientific and medical users of helium, can be assured of a steady supply of the gas for many years to come, Dr. Sayers predicted. Even though the war-built helium plant at Cunningham, Kans., has been dismantled after an excellent wartime record, the four remaining plants operated by the bureau have annual capacities of nearly 250,000,000 cu. ft. of helium.

Permit Sought for Lines From Michigan Storage

WASHINGTON.—Austin Field Pipe Line Co., Detroit, has filed with the Federal Power Commission an application for authority to construct facilities for transportation of natural gas from the Austin and Reed City gas-storage fields near Big Rapids, Mich., to the city gates of Mount Pleasant, Ann Arbor, and Detroit, Mich. The facilities consist of pipe lines and a compressor station.

The proposed facilities would be operated by Michigan-Wisconsin Pipe Line Co. in its service of natural gas to the various districts of the Michigan Consolidated Gas Co. Michigan-Wisconsin proposes to construct a natural-gas pipe line from Hugoton field in Texas to various markets, including several districts of Michigan Consolidated. This project is designed to utilize the Austin and Reed City storage fields.

FPC has conditionally approved Michigan-Wisconsin's application for construction and operation of the line from Texas.

Natural Gas Shows November Sales Gain

NEW YORK.—Sales of natural gas in November rose 6.8 per cent over the same month a year ago with a total of 2,045,777,000 therms against 1,915,917,000 therms. Natural-gas sales for the 12-month period ending November 30, however, dropped 0.6 per cent to 22,778,695,000 therms.

Total utility sales during November rose 7 per cent to show an increase over the comparable month in 1945 for the fifth successive month. Total utility sales in November were 2,325,863,000 therms.

Municipal Gas Plan Loses

Voters in Little Rock, Ark., have rejected a proposal under which the city would take over and operate the city natural-gas distribution system of Arkansas-Louisiana Natural Gas Co.

Gas Sale Criticized

WICHITA.—Terming the delivery of natural gas to the East a "sacrifice," the Wichita Chamber of Commerce last week expressed doubt that southwestern states can afford to permit continued draining of natural-gas reserves when the Northeast "has so much coal it does not need gas."

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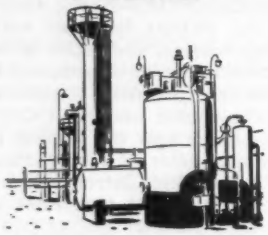

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5. MAXIMUM FLEXIBILITY . . . Petreco desalters are adaptable to any charging stream, large or small; they effectively desalt all crudes—anywhere.

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If you are charging salty crudes—write to Petreco and have a desalting engineer drop in for a visit. Such a discussion obligates you in no way—it will surely give you some new slants on the salt problem.

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REFINING

Two Rubber Plants Sold; Disposal of Others Planned

War Assets Administration has sold two synthetic-rubber plants at Velasco, Tex., to their wartime operator, Dow Chemical Corp., and is preparing to receive bids for the purchase or lease of two others. They do not include any of the petroleum butadiene plants.

Properties bought by Dow included a styrene plant which cost the Government $17,096,825 and a thiokol "N" synthetic-rubber plant which cost $1,386,736. In addition, Dow bought slightly more than half of the Velasco magnesium plant and a 725-acre tract of land northwest of Velasco.

The properties were sold to the chemical company for $35,155,000. The purchases are a part of Dow's long-range expansion program in the Freeport-Velasco area, said Dr. A. P. Beutel, manager of the company's Texas division.

The styrene plant at Velasco, consisting of about 75 buildings, included four complete trains, each with a production capacity of 12,500 tons of styrene annually.

WAA announced it will dispose of two of the major plants built by the Government for the production of butadiene from alcohol. The disposal agency announced it will receive offers on all three plants, but, in view of the recommendation by the Inter-Agency Policy Committee that one plant be held in a stand-by condition, it will accept offers only on two. The plants are at Institute, W. Va., and Louisville, Ky., both operated during the war by Carbide and Carbon Chemical Corp., and at Kobuta, Pa., operated during the war by Koppers, Inc.

Controls Off But Lead Still Short, Ethyl Says

NEW YORK.—Although government restrictions on production and use of tetraethyl lead have been removed, Earle W. Webb, Ethyl Corp. president, has stated that metallic lead is still short. He explained:

"During the period of governmental controls, inventories of metallic lead and tetraethyl lead in our manufacturing plants have been necessarily reduced to rock bottom. Metallic lead is still short.

"It will be necessary to obtain increased supplies of it before we can assure our customers of all the Ethyl antiknock compound they will want to meet the demands from the public for the improved gasoline that was available before the restrictions became effective. We shall do our utmost to secure enough lead to meet these requirements as quickly as possible. In the meantime, any sudden increase in orders will be unfortunate."

Company Publishes Report On Industrial Research

SAN FRANCISCO.—How to organize a working industrial-research department is the subject of a new handbook recently published by Standard Oil Co. of California under the title, "The Coordination of Motive, Men, and Money in Industrial Research."

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science to develop new products, processes and markets, the survey on which the handbook was based enlisted the experience of numerous companies and institutions.

Topics covered include the origins of science, technical research, and laboratories; industrial research motives; general organization and coordination; management guides for executives and key staff personnel, and the provision of funds and their control. The report was prepared by Darrell H. Voorhies, organization counsel in Standard of California's department on organization, with the assistance of his associates and A. L. Lyman, vice president and director of laboratories for California Research Corp.

Plastics Units Will Be Added to Texas Plant

Units for making plastic soon will be added to its Texas City, Tex., plant by Carbon & Carbide Chemicals Corp., subsidiary of Union Carbide & Carbon Corp. The units will create from petroleum gases basic resins used in making molding powders.

The new construction is a part of a $15,000,000 expansion program, which will include new capacity for making butyl alcohol, greater output of industrial solvents and Preston antifreeze compounds, and construction of a new unit to make ethyleneamines. The Texas plant, completed in 1944, produces ethyl alcohol, acetone, and acetic acid, and Prestone from refinery and petroleum gases.

Leonard Refineries Plans Further Improvement

PHILADELPHIA. — Reid Brazell, president of Leonard Refineries, Inc., Alma, Mich., has announced further expansion plans which include revamping of existing refinery facilities in connection with the construction of the first postwar small-scale Houdry Thermofor catalytic cracker. The contract for this work has been awarded to Catalytic Construction Co.

The expansion includes the revamping of the feed-preparation and fractionating sections to tie in with the new TCC unit. The new construction work involves an additional expenditure of $150,000.

T. Ellwood Webster, president of Catalytic Construction, reporting on progress in construction to date, said the erection of the steel structure, kiln, and reactor of the TCC unit is completed. "As previously announced, the construction of the TCC unit will be completed in January 1947, and the revamp work finished early in February," he said.

Chemical Plant Opens

First runs of hydrochloric acid have been made at Denver City, Tex., in the new $500,000 plant of Frontier Chemical Corp. The new plant will begin manufacturing caustic soda about January 10. Salt brine run through the plant is converted by an electro-chemical process into acid and soda, supplied the petroleum industry for various producing and refining operations.

Testing Methods Accepted

PHILADELPHIA.—A new method for determination of sulfur in lubricating oils which contain additives and a test for normal pentane and benzene insolubles in used lubricating oils have been accepted tentatively by the administrative committee on standards of the American Society for Testing Materials. They will be included in the 1946 Book of A.S.T.M. Standards.

Refining Dividends Drop

WASHINGTON.—Publicly reported divident payments by the oil-refining industry declined from $15,800,000 in October 1945 to $13,900,000 in October 1946, but payments for the 3-month period ending October 31 increased to $64,900,000 from $62,300,000 in the corresponding 1945 period, according to the U. S. Department of Commerce.

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ECOLITE

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IN HAZARDOUS PLACES

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- Throws bright beam 1500 ft.

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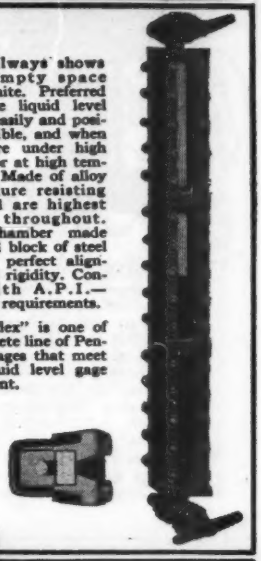
Liquid always shows black—empty space shows white. Preferred where the liquid level must be easily and positively visible, and when liquids are under high pressure or at high temperature. Made of alloy temperature resisting steel and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.



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DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

It costs Less to Prevent Leaks than to stop them!

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The high lubricating quality of RECTORSEAL prevents galling when spinning-up pipe. Retention of its plastic elasticity for the life of the connection prevents "freezing".

Ask your supply store for RECTORSEAL #1 . . . the industry's proven leak preventer.

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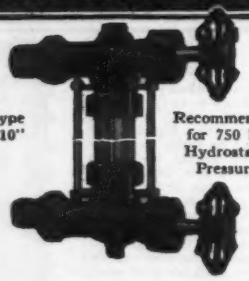

Type "10"

Recommended for 750 lb. Hydrostatic Pressure

Steel construction throughout with stainless steel interior trim. Automatic shut-off is positive and instantaneous; stainless steel balls shut off the flow of liquid when glass breaks. Heavy duty stuffing boxes, union connections, offset construction facilitate cleaning and simplify glass replacement. Conform with A.P.I.—A.S.M.E. requirements.

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PIPE LINES

Shell to Construct 100-Mile Products Line

Shell Pipe Line Corp. plans to start construction between February 15 and March 1 for a 100-mile 6-in. products pipe line between Sheridan field, Texas, recycling operations and the Deer Park, Tex., refinery of Shell Oil Co., Inc.

It is expected that specifications will be issued to contractors, to bid on the line construction, between January 15 and February 1. Contract for the pump-station building has been let; machinery and controls will be installed by Shell.

The line will handle recycling and gasoline-plant products ranging from propane to distillate which will be moved in batches.

The line will be coated with one coating of enamel into which glass mat will be pulled by the double-headed doping machine on the job which will also wrap asbestos felt so that it will be bonded in the hot enamel.

There will be only one pump station on the line; this will be located at Sheridan. Two pumping units will be installed with interchangeable features. Each of these will have an Aldrich vertical triplex pump. The main operating unit intended to carry the load continuously will have a capacity for moving 7,000 bbl. daily. The other unit will serve as a standby with 10 per cent less capacity—6,700 bbl. daily. The system has been designed for pressures up to 900 psi. The 125-hp. motors at the pump stations and the booster units, for bringing products to the pumps, will all be explosion-proof types. Walls of the pump station will be of glazed tile; the station will have a flat roof. Meter equipment at Deer Park has been designed for handling the entire range of products to be transported.

Efficient Line Operation Allows Higher Rangely Take

Efficient operation of the Utah Oil Refining Co. pipe line and failure of bad weather to hamper operations have enabled the purchasing department of Standard Oil Co. (Ind.) to increase its per well take from Rangely field in Colorado.

The company, which has been taking 135 bbl. per well daily, has increased the figure to 150 bbl., raising the total new daily take from the field to between 25,500 and 26,000 bbl. Utah Oil Refining Co. is an Indiana Standard subsidiary.

Hackerman to Address Corrosion Engineers

Dr. Norman Hackerman, chemistry professor in the University of Texas, will address the National Association of Corrosion Engineers on "Mechanism of Inhibitor Action" at its annual convention at the Palmer House in Chicago April 7-10.

Other speakers on the program, according to Dr. R. B. Mears, Houston, chairman of the program committee, will include J. T. Gow, of the Batelle Memorial Institute; B. G. Crane, member of Ethyl Corp. research staff; and N. E. Berry, director of research for Servel Corp.

Dr. Hackerman will speak before the general industry symposium, one of five technical sessions scheduled.

PIPE LINE SUPPLIES AND EQUIPMENT

CARDWELL AUTOMATIC RELEASE PIPE TONGS

These pipe tongs automatically release the pipe when the operator slacks the line. This eliminates the necessity of having a man in the ditch to release the tongs after the pipe has been lowered in. Oversize pads for tongs are available for handling coated pipe. Sizes are stocked to fit from 7" to 26" pipe. Other sizes are available on order.

The Clarence L. Boyd Co., Inc.
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Tulsa, Oklahoma

The convention also will feature an exhibition of the latest developments in materials, services, equipment, and devices now available for use in the fight to reduce corrosion loss.

Big-Inch Lines' Delivery Connections Increased

Arrangements are being made to increase the number of connections for delivering natural gas from the big-inch and little big-inch lines in the Ohio-Pennsylvania area. Early this week input pressures at Many, La., and Longview, Tex., were between 500 and 600 psi. Delivery pressures in Ohio and Pennsylvania were 100 to 150 psi. Gas was being delivered at the rate of 100,000,000 cu. ft. daily.

In Washington the Federal Power Commission announced a distribution formula for gas from the two lines following a 3-day meeting of its industry advisory committee. Under the newly adopted plan Panhandle Eastern Pipe Line Co. will receive 20,000,000 cu. ft. daily. If deliveries total 100,000,000 cu. ft. or more, 5,000,000 cu. ft. will go to systems to be named by Tennessee Gas & Transmission Co., with approval of FPC.

Of the remainder, 50 per cent will go to Columbia Gas & Electric Corp., 25 per cent to Consolidated Natural Gas Co., 10 per cent to National Fuel Gas Co., and 15 per cent to Equitable Gas Co.

Meanwhile, FPC said, applications by individual firms for authority to construct natural-gas pipe lines to the East will not be acted upon until final disposition of the government-owned lines is made. Several firms which entered bids on the two government lines have indicated they will attempt to build their own if efforts to purchase are unsuccessful, and one, Trans-Continental Gas Pipe-Line Co., has filed an application for outright permission to build a line from Texas to the Maryland-New Jersey-New York area.

Radar Aids Oil Barge Operation

Experiments now being conducted with radar equipment on oil barges indicate possibilities for aiding navigation at night and in foggy weather.

It is expected that radar will overcome difficulties which have contributed at times to irregularity of barge deliveries. Ashland Oil & Refining Co.'s barge "Tri-State" has been using radar equipment recently on the Ohio River.

Gas Line Completed

A new main line to supply natural gas to Independence, Mo., and vicinity has been completed by Cities Service Gas Co. and Gas Service Co. The new line ties into the company's main line from the Ottawa, Kans., compressor station to Sedalia, Mo.

Block 12 Outlet Finished

Texas-New Mexico Pipe Line Co. has completed a 13-mile line of 6 and 8-in. pipe to serve as an outlet for Block 12 field in Andrews County, Texas. The new carrier takes oil from the field's 16 producing wells to the Dollar Hide booster station in the southwest corner of the county.

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STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED DECEMBER 28, 1946

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1946				
	Comp.	Oil	Gas	Dry	Footage	1946	1945	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	19	9	0	*10	26,320	1,556	1,470	0	0	0	0	0	0	0	0	0	0
Pennsylvania	46	20	4	†22	72,980	3,909	4,014	0	0	0	0	0	0	0	0	0	0
West Virginia	17	3	12	2	42,219	749	802	0	0	0	0	0	0	0	0	0	0
Ohio	24	5	13	6	71,516	1,273	981	0	0	0	1	1	4	0	16	44	64
Indiana	3	2	0	1	7,419	377	194	0	0	0	0	0	6	0	0	20	26
Kentucky	1	1	0	0	2,045	470	579	0	0	0	0	0	7	0	0	37	44
Illinois	49	29	0	20	126,683	2,311	1,810	1	0	0	2	3	55	0	3	449	507
Michigan	16	0	4	12	24,769	814	753	0	0	0	5	5	23	0	10	258	291
Kansas	52	26	5	21	165,864	2,041	1,790	1	0	0	6	7	31	0	2	271	304
Neb., Mo., Iowa	0	0	0	0	0	19	29	0	0	0	0	0	0	0	0	14	14
Oklahoma	57	27	7	‡23	178,388	3,039	2,426	0	0	0	13	13	93	0	39	437	569
Texas	126	89	8	29	651,655	7,782	7,068	5	0	0	19	24	213	29	34	1,295	1,571
North Central	20	16	0	4	64,510	2,687	2,239	0	0	0	1	1	75	0	4	523	602
West	50	42	0	8	304,134	1,779	1,735	3	0	0	5	8	50	0	1	173	224
Panhandle	10	6	3	1	30,873	310	532	0	0	0	0	0	0	0	0	5	5
Eastern	13	7	3	3	77,984	688	401	1	0	0	1	2	46	22	13	238	319
Gulf Coast	22	13	2	7	139,576	1,720	1,656	1	0	0	6	7	22	5	6	126	159
Southwest	11	5	0	6	34,578	598	505	0	0	0	6	6	20	2	10	230	262
Louisiana	25	16	2	7	149,030	1,401	1,111	1	0	0	6	7	46	14	8	186	254
Northern	16	9	2	5	72,469	798	494	0	0	0	5	5	9	0	3	102	114
Southern	9	7	0	2	76,561	603	617	1	0	0	1	2	37	14	5	84	140
Arkansas	4	2	0	2	11,592	183	186	0	0	0	2	2	9	0	0	41	50
Mississippi	12	8	0	4	98,037	270	355	0	0	0	4	4	2	0	1	77	80
Southeastern States	1	0	0	1	1,175	44	59	0	0	0	1	1	1	0	0	36	37
Montana	4	2	2	0	5,481	312	314	0	0	0	0	0	10	0	4	32	46
Wyoming	1	1	0	0	1,000	168	229	1	0	0	0	1	14	0	3	34	51
Colorado-Utah	7	7	0	0	45,354	171	61	0	0	0	0	0	5	0	0	18	23
New Mexico	13	11	2	0	61,658	408	421	0	0	0	0	0	4	0	0	38	42
California	36	32	0	4	138,760	1,472	2,191	0	0	0	4	4	27	0	7	236	270
Total United States	513	290	59	164	1,881,945	28,769	26,843	9	0	0	63	72	550	43	127	3,523	4,243
Total previous week	634	323	62	249	2,077,223	28,256	26,334	9	0	3	89	101	541	43	127	3,460	4,171
Total Dec. 29, 1945	509	287	38	184	1,793,548			10	0	0	49	59	512	23	133	3,418	4,086

Service wells included: *10, †21, ‡3.

MARKET QUOTATIONS

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.17	....	....	....
19-19.9	1.21	....	....	....
20-20.9	1.24	$1.30	....	$1.17
21-21.9	1.28	1.32	....	1.19
22-22.9	1.32	1.34	....	1.21
23-23.9	1.35	1.36	....	1.23
24-24.9	1.39	1.38	$1.61	1.25
25-25.9	1.43	1.40	1.63	1.27
26-26.9	1.46	1.42	1.65	1.29
27-27.9	1.50	1.44	1.67	1.31
28-28.9	1.54	1.46	1.69	1.33
29-29.9	1.57	1.48	1.71	1.35
30-30.9	1.61	1.50	1.73	1.37
31-31.9	....	1.52	1.75	1.39
32-32.9	....	1.54	1.77	1.41
33-33.9	....	1.56	1.79	1.43
34-34.9	....	1.58	1.81	1.45
35-35.9	....	1.60	1.83	1.47
36-36.9	....	1.62	1.85	1.49
37-37.9	....	1.64	1.87	1.51
38-38.9	....	1.66	1.89	1.53
39-39.9	....	1.68	1.91	1.55
40 and above	....	1.70	1.93	1.57

*For crude from Daboval, El Campo, and Sandy Point. †Includes Lea County, New Mexico.

(Quotations shown here are f.o.b. plant in tank cars and in cents per gal. as of last Monday.

REFINERY GASOLINE

Octane (A.S.T.M.) 78-80†	73-75
Mid-Continent* 7.375-7.625	6.750-7.000
Tex. Gulf Coast 7.50-7.75	6.750-7.125
New York Harbor 9-10.75	8-9.25
California	6.250-6.750

*Basic Oklahoma Group 3. †1939 C.F.R. (research method).

NATURAL GASOLINE

Grades—	26-70	18-55
Oklahoma (Group 3)	5-5.125	6-6.15
N. Texas (f.o.b. plant)	4.500	5.400
N. Louisiana (f.o.b. plant)	4.750	5.700
California (averages)	5.500	6.250

CRUDE-OIL PRICES

Representative posted schedules per bbl.

East Texas	$1.70
Kettleman Hills, California*	1.69
Beauregard Parish	1.65
Illinois Basin	1.82
Pecos County, Texas (Yates)	1.40
Bradford, Pennsylvania	3.55
Eastern Ill., and Western Ind.	1.67

Note: Crude prices exclusive of subsidy.

A.P.I. REFINERY REPORT

Week ended December 21, 1946
(Figures in thousands of barrels)

	Dly. crude runs to stills	Stocks— Gasoline	Distillate	Residual
East Coast	776	19,077	22,140	9,356
Appalachian	160	3,388	617	514
Ill., Ind., Ky.	775	16,213	6,702	4,240
Okla., Kan., Mo.	392	8,716	2,878	1,285
Inland Texas	216	3,436	532	751
Tex. Gulf Cst.	1,190	13,935	10,874	6,883
La. Gulf Cst.	329	4,753	3,890	2,119
N. La., Ark.	61	1,677	523	115
Rocky Mtn.	135	2,010	474	640
California	786	16,349	12,278	28,314
Total 12-21-46	4,820	89,554	60,608	54,217
Total 12-14-46	4,685	88,678	62,147	56,090
Total 12-22-45	4,595	92,762	38,805	40,752

CRUDE-OIL STOCKS

(Bureau of Mines Estimate)

Week ended—	Bbl. of crude*
December 14, 1946	226,966,000
December 7, 1946	225,419,000
December 15, 1945	219,518,000

*Excludes unrefinable Calif. stocks.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 28 crude oil	B. of M. Dec. demand	Dec. 21 crude oil
Alabama	1,100	1,200	1,150
Arkansas	80,250	76,000	80,150
California	889,000	845,000	876,500
Colorado	37,760	32,000	36,980
Eastern	63,000	64,200	67,800
Florida	250	200	270
Illinois	199,500	210,000	201,900
Indiana	17,400	19,000	18,400
Kansas	278,200	263,000	275,650
Kentucky	30,100	29,000	30,100
Louisiana	410,075	382,000	410,075
North Louisiana	99,750	.....	99,750
South Louisiana	310,325	.....	310,325
Michigan	41,820	46,000	42,010
Mississippi	84,750	60,000	85,100
Montana	21,980	24,000	23,490
Nebraska	700	800	700
New Mexico	102,500	98,000	102,500
Oklahoma	371,750	380,000	371,450
Texas	1,996,065	2,050,000	1,996,065
District 1 (Southwest)	18,850	.....	18,850
District 2 (Southwest)	134,775	.....	134,775
District 4 (Southwest)	208,800	.....	208,800
District 3 (Gulf Coast)	422,625	.....	422,625
District 5 (Eastern)	34,615	.....	34,615
District 6 (Eastern)	99,375	.....	99,375
East Texas field	316,000	.....	316,000
District 7C (West)	27,700	.....	27,700
District 8 (West)	499,725	.....	499,725
District 7B (W. Central)	34,500	.....	34,500
District 9 (N. Central)	118,000	.....	118,000
District 10 (Panhandle)	81,100	.....	81,100
Wyoming	103,130	96,000	102,960
Miscellaneous	.....	600	.....
Total United States	*4,729,330	4,677,000	4,723,250
Change from prev. week, up	6,080		

Total production January 1-December 28..... †1,720,774,654 bbl.
Same period last year (crude, plus condensate) 1,690,868,025 bbl.
*Not incl. 23,965 bbl. condensate. †Incl. 8,692,270 bbl. condensate.

CRUDE-OIL STOCKS 226,966,000 bbl. as of December 14—up 1,547,000 bbl. One year ago 219,518,000 bbl.

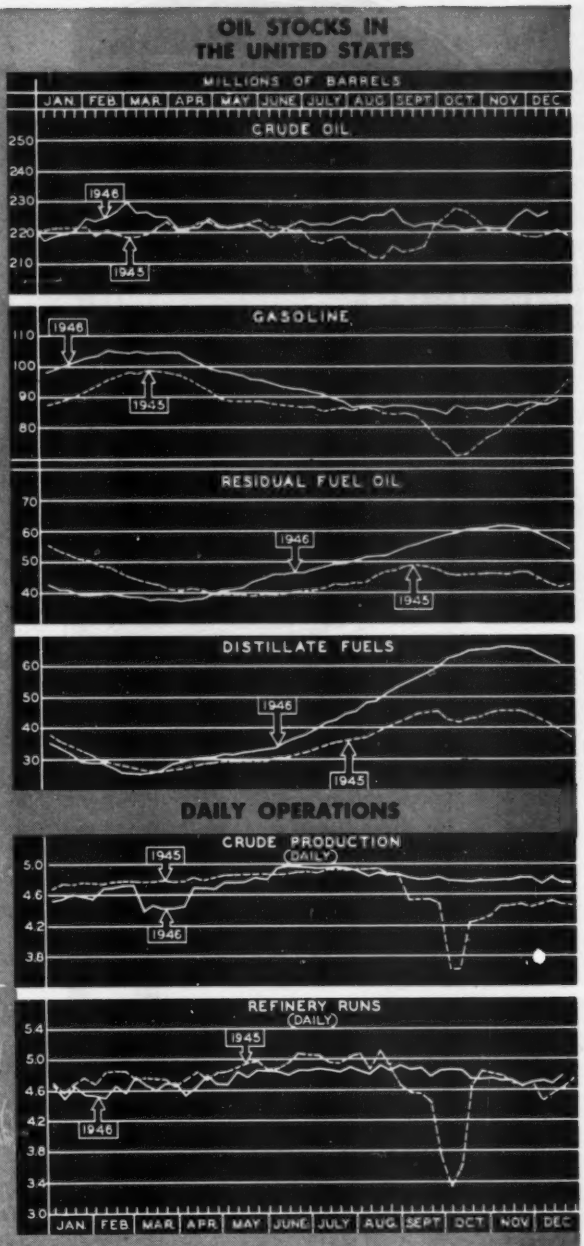
GASOLINE STOCKS 89,554,000 bbl. as of December 21—up 876,000 bbl. One year ago 92,762,000 bbl.

RESIDUAL FUEL-OIL STOCKS 54,217,000 bbl. as of December 21—down 1,879,000 bbl. One year ago 40,752,000 bbl.

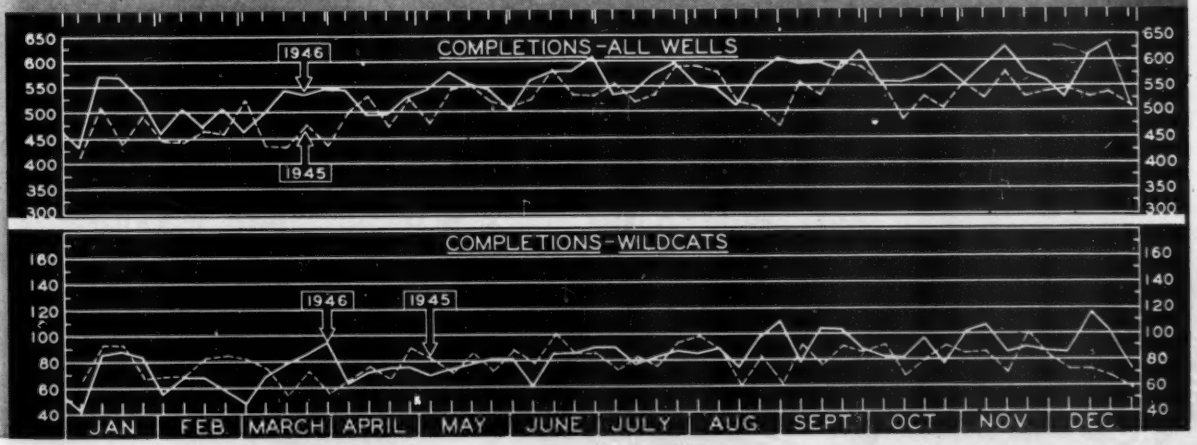
GAS OIL AND DISTILLATE STOCKS 60,608,000 bbl. as of December 21—down 1,539,000 bbl. One year ago 38,805,000 bbl.

CRUDE-OIL PRODUCTION 4,729,330 bbl. as of December 28—up 6,080 bbl. One year ago 4,468,850 bbl.

REFINERY RUNS 4,820,000 bbl. daily week ended December 21—up 135,000 bbl. One year ago 4,595,000 bbl.



Solid line charts weekly completions, service wells in Eastern area included.



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Exploration and Drilling

Geologists Look at 1947

AT Wichita, Kans., on January 16 and 17, geologists will get together in a regional meeting. Most of those attending will have two ideas in mind. One, to listen to a formal program that has been carefully selected and balanced; two, to exchange ideas and absorb impressions from as many other geologists as possible in the limited time available.

The scope and purposes of the Wichita meeting are directly in line with the general trend of the geological programs of most of the companies for 1947. This year, so far as possible, the geological departments will study every exploratory play both as an individual problem and as a component part of a broad regional condition. Every scrap of information, every wildcat drilled, will be studied closely for the light it throws on both local geology in the immediate vicinity, and for its proper place in evaluation of a whole geological basin.

In 1947 every geological dollar is expected to do double duty. It must contribute to the short-range program of finding new fields in 1947, and it must also contribute to the long-range knowledge that will make finding new fields easier in 1948 and subsequent years.

The reason for this attitude is simple: it pays off in dollars and cents. Discovery of one new field can be followed by a rapid evaluation of the best prospects for finding other fields of the same type throughout a large region. The reverse is also true. If, in one dry wildcat, some significant factor is found that shows a previous concept of conditions in that region was not correct; then the whole regional concept must be reexamined. All tentative wildcat locations based on that concept must be rechecked, and some of them will be eliminated from the budget.

In view of this trend in company policies, it is not surprising that the advance registrations point to an attendance record for the Wichita regional meeting that would once have been thought excellent for a national meeting. Moreover, these advance notices indicate that a high percentage of the attendance will come from the younger geologists. This is extremely pleasing to the A.A.P.G. national officers, since meeting the needs of these younger men has been a matter of serious discussion all year.

The formal program is designed to achieve two objectives: one, to widen the geological thinking horizons of the younger men by treating whole regions and their future oil possibilities in a series of papers; two, to discourage stereotyped thinking about the types of geological conditions under which oil may be found. This latter objective will be sought through a series of papers on unusual oil fields in Oklahoma, Kansas, Michigan, the Rocky Mountain region, and Canada.

In addition to this formal program, the national A.A.P.G. research committee will hold a series of meetings January 15, the day before the main meeting opens. In these, the research committee will throw open for discussion the result of almost 2 years' work on the biggest job ever attempted by a professional society. This work of outlining the gaps in the field of geological knowledge and lining up projects to fill the gaps has progressed so far beyond the "vision" and "hope" stages, that nearly a dozen projects or subdivisions of projects are in the preliminary blueprint stage, ready for semi-final discussion.

At Wichita, it is hoped that the last rough edges can be knocked off these projects, so that only a polishing job will remain in March, before presentation to the national executive committee for final approval.

N. CENTRAL TEXAS

New Ellenburger Pool In Callahan County

WICHITA FALLS.—Ellenburger production in Callahan County appeared certain last week at E. E. Fogelson and M. S. Ingleright's 1 Baum-Swafford, located in the southeast corner of the county, 5 miles west of Cross Plains and on the eastern edge of the Baum area, where most production is from shallower Pennsylvanian zones. Production gage cannot be made until storage is completed, but operators said that when plug was drilled last week the well began flowing oil and wash water under heavy gas pressure, with no indication of formation water. The Ellenburger was topped at 3,838 ft., drilled out to 3,862 ft., and casing set at 3,841 ft.

A new shallow sand pool in south Shackelford County was opened at Street Investment Co. 1 W. H. Green, 9 miles southwest of Albany. The well was completed for a pumping potential of 35 bbl. of oil a day at 1,203-07 ft. Location, in Section 49, Block 12, T&P Survey, is within ¼ mile of a 4,710-ft. dry hole drilled about 3 years ago.

New Caddo limestone production was promised at Bridwell Oil Co.'s 1 Earl Spring, Block 51, Marion County School Lands Survey, 5 miles southwest of Ringgold. Caddo was topped at 5,699 ft., on an elevation of 978 ft., with dry lime reported at 5,699-5,741 ft., then lime with an odor of oil at 5,741-54 ft. A 40-minute drill-stem test at 5,740-54 ft. recovered 20 ft. of oil and 25 ft. of oil-cut mud, with bottom-hole pressure at 1,200 lb. The well was drilled to 5,805 ft. in dry lime, but showed a good odor at 5,775-95 ft. Two tests of the interval failed and operators were preparing to run a third.

NORTH CENTRAL TEXAS WILDCAT FAILURE

Grayson County: Seitz, Comegys & Seitz 1 Minnie K. Fielder, J. D. Nelson Sur., 6 mi. SE of Collinsville, dry, TD 4,951 ft., Ellenburger 4,890 ft., DST 3,138-49 ft., open 30 minutes, recovered 75 ft. salty mud.

SOUTHWEST TEXAS

New Pay on East Flank of Hull

HOUSTON.—New oil sand has been opened on the east flank of Hull field in Liberty County by American Republics Corp. 176 Dolbear in the J. Devore League. On potential test flowed 139 bbl. of 41.8° oil in 24 hours through a 13/64-in. choke with 800 psi. flowing pressure on the tubing, and a gas-oil ratio of 892. Production is through perforations at 5,085-90 ft., sands being in the Middle Yegua formation from 5,054-5,104 ft., with effective saturation topped at 5,084 ft. Total depth is 6,950 ft. with 7-in. casing at 5,142 ft.

Also in Liberty County, Claud B. Hamill 1 Stewart, near the old Cleveland field, showed 65 psi. pressure in 12 minutes and recovered 245 ft. of oil and 80 ft. of salt water on drill-stem test of open hole near the bottom. Total depth is 5,782 ft., and the 5½-in. pipe has been cemented on the bottom. The test is credited with 10 ft. of saturation from 5,768-78 ft.

Ohio Oil Co. 1-A Nada Unit, a new deep sand discovery, located 3,000 ft. southwest of nearest gas-condensate production in the Nada field, Colorado County, is cleaning from a new testing level. On an initial try through two sets of perforations at 9,946-51 ft., and 9,980-96 ft., the well flowed gas and condensate with salt water content up to 50 per cent. Perforations were squeezed and a new set shot from an estimated level, 9,906-10 ft. where it now cleans through a 9/64-in. choke, showing mostly wash water and gas at the present time. Flowing pressure on tubing

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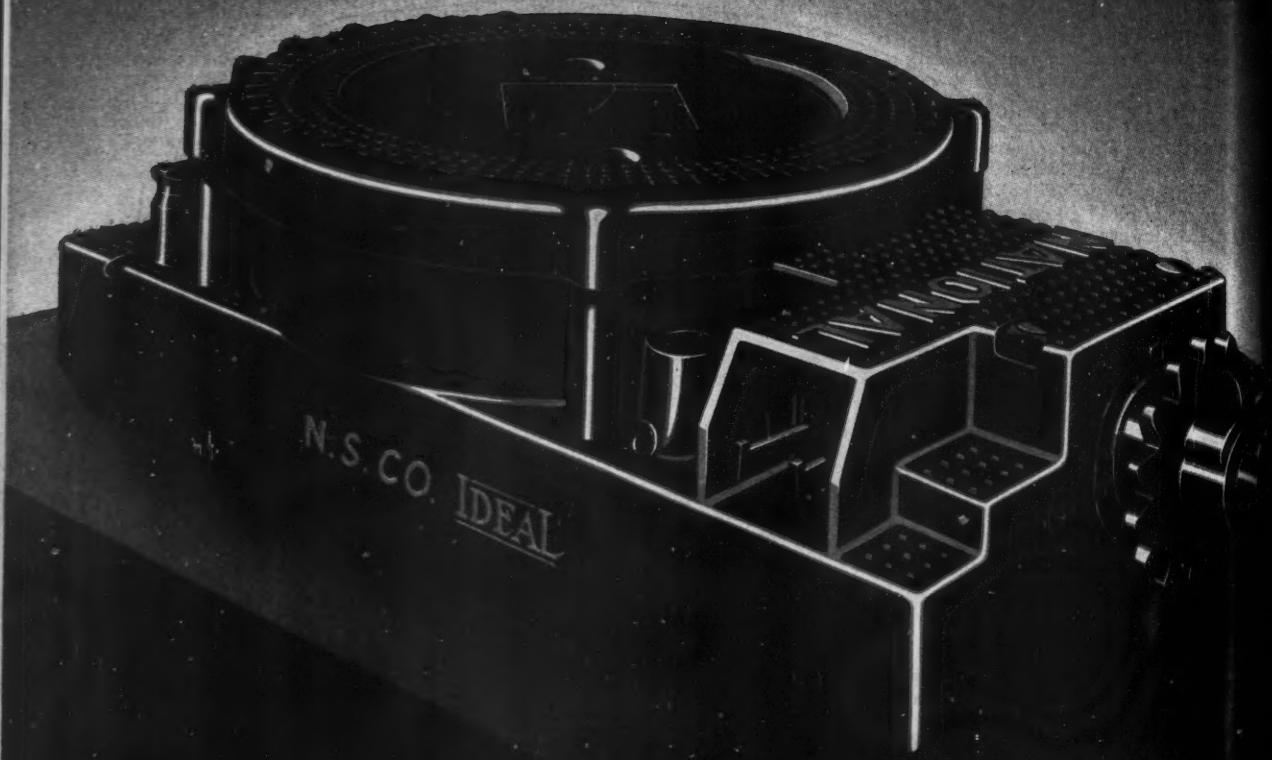

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is 2,800 psi., and 700 psi.. on the casing. Total depth is 10,332 ft.

Standard Oil Co. of Kansas 1 August Pietsch, wildcat in the J. R. Phillips League, Abstract 83, 8 miles north of LaGrange in Fayette County, has been swabbing a considerable amount of oil from the Wilcox sands while testing through perforations. Total depth is 6,918 ft. and 5½-in. casing is cemented at 6,641 ft.

There were nine new locations reported this week, two being wildcats, one each in Brazoria and Wharton counties. The nine completions included four wildcats, one a new sand opener in Hull field, Libery County, while three were dry, one each in Brazoria, Chambers and Jackson counties.

UPPER GULF COAST TEXAS SUCCESSFUL WILDCAT

Liberty County: New oil sand in Hull field —American Republics Corp. 176 Dolbear, in J. Devore League, TD 6,950 ft., top sand 5,054 ft., Middle Yegua formation, perforations 5,085-90 ft., IP 138 bbl. per day through a 13/64-in. choke, gas-oil ratio 892 cu. ft., TP 225 psi., CP 800 psi., gravity 41.8°, 40 per cent water.

UPPER GULF COAST TEXAS WILDCAT FAILURES

Brazoria County: John B. Coffee and Holmes Drlg. Co. 1 A. P. George, in Geo. Tennille Survey, 1½ mi. N of West Columbia, dry, TD 7,053 ft.

Chambers County: Humble 2-D State-Galveston Bay, Smith Point area, Section 137, dry, TD 9,860 ft.

Jackson County: John B. Coffee 1 Four-Way Ranch et al, in I&GN Survey 14, ½ mi. N of LaWard, dry, TD 6,512 ft.

SOUTH LOUISIANA

New Deep Pay for South Jennings Field

NEW ORLEANS.—A new deep high-pressure gas and condensate producing sand has been opened in South Jennings field, Jefferson Davis Parish, by Stanolind Oil & Gas Co. 8 South Jennings Unit. After installing a 15,000-lb. christmas tree, the well gaged 45 bbl. of condensate daily through a 6/64-in. choke with a gas ratio of 16,556. Flowing pressure on the tubing was 6,800 psi. Total depth is 12,034 ft., 7-in. casing set at 10,925 ft. with 5-in. liner to 11,650 ft. for completion through perforations at 10,925-10,936 ft. Other gas-condensate bearing sands were recorded at 8,115-20 ft., 8,190-8,200 ft. and 7,010-20 ft.

Magnolia Petroleum Co. 58 Louisiana Gulf Block, deepest well drilling offshore in the Gulf of Mexico, 5 miles from Point Au Fer, the nearest land, is at a depth of 12,198 ft. and drilling deeper.

Stanolind 1 Ezeb Guillory in the SW 29-6s-2e, in Swords area of St. Landry Parish, flowed gas and condensate on drill-stem test through perforations at 8,952-58 ft. Total depth is 9,861 ft., and 5½-in. casing is cemented to the bottom.

A new deep oil well for the Caillou Island field in Terrebonne Parish, The Texas Co. 83 State-Caillou Island on State Lease 188, flowed a commission gage of 89 bbl. of oil daily through an 11/64-in. choke with gas ratio 9,323. Flowing pressure on the tubing is 2,650 lb. Gravity 42.8°. Total depth is 11,287 ft., and pipe is perforated from 10,988-11,000 ft. for completion.

Union Producing Co. and M. H. Marr 1 John Tyler, second deep Tuscaloosa try in the Big Island field of Rapides Parish, has made a production test and continues to make a series of flow checks. It is located in NE NE 14-4n-3e, ½ mile east of the 1 Belgard discovery producer from the deep horizon. Total depth is 10,074 ft. On a drill-stem test of open hole below the 7-in. pipe, 10,066-074 ft., recovered 108 stands of gas-cut mud and some free oil, using ⅜-in. and ¼-in. chokes.

The Louisiana Conservation Commission has set the daily allowable production of crude oil for January at 446,426 bbl. daily, which is an increase of 2,015 bbl. daily over the December allowable. North Louisiana pools were allocated 101,810 bbl. of the daily allowable while 344,607 bbl. daily were allocated to the South Louisiana district.

Only 2 exploratory tests were completed this week, one a new pool opener and one a dry hole, both in Beauregard Parish. Eight new locations included one wildcat in Terrebonne Parish. Development completions were six oil and one dry, two in Terrebonne, and one each in Acadia, Jefferson Davis, LaFourche and St. Landry parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Beauregard Parish: New oil pool—Longville (Seale)-Barnsdall Oil Co. 1 Long Bell Lbr. Co., center NW SW NE 1-6s-10w, 4 mi. N of Gordon field, TD 8,430 ft., perf. 8,236-53 ft. Cockfield sand, top Cockfield 8,228 ft., PT 293 bbl. 24 hours through a 9/64-in. choke, TP 1,500 lb., gravity 49°, no water.

SOUTH LOUISIANA WILDCAT FAILURE

Beauregard Parish: Sun Oil Co. 2 Rice Ld. Lbr. Co., 6-5s-11w, 4 mi. N of West Pinegrove production, dry, TD 7,935 ft.

APPALACHIAN FIELD

Slab Fork Test Dry In Oriskany Sand

PITTSBURGH.—In Slab Fork district, Wyoming County, West Virginia, Owens Libby Owens Gas Department logged the Oriskany sand at 6,672-85 ft. in the deep wildcat on Western Pocahontas Corp. tract and it was void of any showing. The surface elevation is 2,018 ft.

In Crook district, Boone County, Hope Natural Gas Co. completed 9,043 Loup Creek Colliery Co. with final gage after shot of 1,309,000 cu. ft. gas; Maxton sand 2,351-77 ft., gas 2,358-72 ft., total depth 2,420 ft.

In Elk district, Kanawha County, Joe Rubin completed a deep test on Alfred Phillips farm good for 4,635,000 cu. ft. gas, natural, elevation 779 ft., Corniferous lime 4,916 ft., Oriskany 5,020 ft., gas 5,037-47 ft., rock pressure 980 lb. in 52 hours, total depth 5,044 ft. In Malden district, Spartan Gas Co. drilled through the Oriskany sand in 3 Blue Creek Coal & Land Co. and it was dry; Oriskany 5,374 ft., total depth 5,474 ft.

In Union district, Putnam County, Godfrey L. Cabot, Inc., completed 1,207 Poca Coal Land Co. as a good Injun sand gas well gaging 2,524,000 cu. ft., total depth 1,931 ft.

In Clear Fork district, Raleigh County, George L. Ballentine completed a test on Charles C. Dickinson farm in the Weir sand with a final open flow of 2,044,000 cu. ft., total depth 2,425 ft.

In Birch district, Braxton County, Philadelphia Oil Co. completed 11 Gertrude B. Howell good for 40 bbl., Salt sand, total depth 1,520 ft.

In the Young pool in North Strabane Township, Washington County, Pennsylvania, Charles E. Young completed deepening No. 1 R. D. Fulton, a former Salt sand gas producer, to the Gordon sand, and got a 50-bbl. well.

In Summit Township, Erie County, Appalachian Development Corp. topped the Oriskany sand at 2,280 ft. in the wildcat on Carl W. Held farm. At 2,293 ft. it struck salt water which rose 1,200 ft. in the hole.

TEXAS GULF COAST

New Depth Record For S. Texas Coast

CORPUS CHRISTI.—The deepest well ever drilled in the lower coast sector of Texas is now at a depth of 14,671 ft., running Schlumberger. The Texas Co. 6 Yturria Land & Livestock Co., Carricitos grant, in the Raymondville vicinity of Willacy County, is reported to be making an average of 34 ft. daily in sand and shale. It was spudded in June 22, last, projected to the Frio sand section. It is the deepest test ever drilled by The Texas Co.

A new oil pool named Farenthold has been opened in Nueces County by Rand Morgan 1-A fee, located in Richard King farm lots, a mile northeast of the Richard King field. On a test this well flowed 33 bbl. of oil per day through a 5/64-in. choke, with 1,500 lb. tubing pressure, and 2,040 lb. casing pressure. Production is through perforations at 5,605-09 ft. Total depth is 5,848 ft. Morgan is now drilling his 2-A fee 933 ft. southwest of the discovery, and Southern Minerals Corp. is in the pay in its first well in this new field, the 1-D Richard King Estate, 1,600 ft. southeast of the discovery. Southern Minerals 2-D Richard King has been staked 933 ft. west of the 1-D King and 1,100 ft. southeast of the Rand Morgan 2-A fee drilling well.

The Texas Co. 1 Northeast Farming Co., a new discovery in Zavala County, is being completed on the pump. Well is now standing with 1,100 ft. of 19°-gravity oil in the hole, along with 10 ft. of cavings, at total depth 3,372 ft. The 7-in. casing is set on top of the pay at 3,300 ft. Operators experienced difficulty with cavings after using nitroglycerin. This well is in Cross S. Ranch Co. subdivision, 6 miles northwest of Crystal City.

Atlantic Refining Co. 1 Lee M. Dugger, northwest extension well at North Minnie Bock field, Nueces County, flowed 5 bbl. of oil per hour, 36°-gravity oil, with only 0.1 per cent basic sediment and water, through a 3/16-in. choke, with tubing pressure of 180 lb. up to 200 lb. Gas-oil ratio 515. Production is through perforations at 6,138-43 ft. Well is located in Section 53.

The Nomenclature Committee of the South Texas Geological Society has announced the names assigned to recently opened producing areas as follows: Lagarto, discovered by Roxie Wright et al 1 Sam Beale, in W. J. Cannon Survey, in southeastern Live Oak County; Hughes, discovered by Killam & Hurd 1 J. G. Garcia, in Los Ojuelos grant 592, Block 47, in Webb County.

The 25 new locations reported this week included eight wildcats, one each in Bee, Cameron, Jim Hogg, LaSalle, Live Oak, Medina, Nueces and Starr counties. Nueces County received the greatest activity with five new starts reported. There were 24 completions, 13 oil wells, 1 gas and 10 dry holes of which 9 are wildcats, 2 in Zapata, and 1 each in Bee, Bexar, Brooks, Caldwell, Duval, Jim Wells and Webb counties.

SOUTHWEST TEXAS WILDCAT FAILURES

Bee County: Bridwell Oil Co. 1 Mary K. Hartman, in Geo. O'Docharty Survey, 4 mi. NW of Skidmore, dry, TD 4,605 ft.

Bexar County: Ralph E. Fair, Inc., Jack Woodward, Inc., and Frank Lefevre 1 Pauline Lyre, in Jose Maria Bustillos Survey 29, 1 mi. N of St. Hedwig, dry, TD 4,607 ft.

Brooks County: George Parker and Chas. L. McCune 2 L. G. Denman, in Jose

Marcelo Ynojosa grant, 15 mi. SE of Hebbronville, dry, TD 5,468 ft.

Caldwell County: W. Killam 1 Edd D. Rodenberg, in Guadalupe College Survey, 6 mi. S of Lockhart, dry, TD 2,315 ft. in Edwards lime.

Duval County: H. R. Cullen 1 V. Garcia, in Guadalupe Alanis Survey 3, 12 mi. NW of San Diego, in Rosita area, dry, TD 3,850 ft.

Jim Wells County: Flowers & Ward 1 G. B. Garcia, in San Diego de Arriba grant, 9 mi. N of San Diego, dry, TD 5,225 ft.

Webb County: Magnolia Pet. 1 Barreda, in Joaquin Galan grant, 18 mi. NW of Callaghan, dry, TD 4,212 ft.

Zapata County: Government Wells Oil Co. 3 Juana Garza de Uribe, in TCRR Survey 250, 25 mi. S of Mirando City, dry, TD 1,332 ft.

Frank J. Gravis et al 2 J. J. McGrath et al, in Survey 613, 11 mi. SW of Aguilares, dry, TD 1,420 ft.

drilled ahead until cones were lost, resulting in present fishing job.

WEST TEXAS SUCCESSFUL WILDCATS

Andrews County: New oil field—Humble Oil & Refining Co. 2 H. O. Sims, Sec. 25, Blk. A-39, elevation 3,376 ft., flowed 704 bbl. 42°-gravity oil per day, ¼-in. tubing choke, from perforations in the Ellenburger at 10,466-531 ft., tubing pressure 920 psi., casing sealed off, GOR 363:1, TD 10,535 ft.

Coke County: New oil field, 1 mile south of town of Old Silver—Sun Oil Co. 1 A. Jameson, Sec. 253, Blk. 1-A, H&TC Sur., elevation 2,080 ft., flowed 168 bbl. 46° oil per day, Crinoidal limestone 6,225 ft., topped at 6,200 ft., ¼-in. tubing choke, tubing pressure 250 psi., casing pressure 700 psi., GOR 1,684:1, TD 6,245 ft.

Crane County: New oil field—Standard Oil Co. of Texas 1 Nellie Tucker, Sec. 21, Blk. 3, H&TC Sur., elevation 2,448 ft., flowed 127 bbl. 53.5° oil and 2,500,000 cu. ft. gas per day; Simpson pay topped at 5,770 ft., perforated 5,750-80 ft., tubing pressure 1,575 psi., casing pressure 1,825 psi., GOR 11,150:1, TD 6,304 ft., plugged back to 5,840 ft.

WEST TEXAS WILDCAT FAILURES

Crane County: Gulf Oil Corp. 8-E McKnight, Sec. 23, Blk. B-17, PSL, 1 mi. N of McKnight field, elevation 2,710 ft., dry, TD 8,845 ft., Devonian 6,687 ft., Waddell 8,404 ft., Simpson 7,530 ft., Ellenburger 8,740 ft., slight show of oil in core at 8,712-32 ft. with odor of sulfur water.

Crockett County: Loffland Bros. 1 V. B. Cox, Sec. 40, Blk. ST, E. Foster Sur., 16 mi. S of Todd Deep, elevation 2,507 ft., dry, TD 10,939 ft., Simpson 9,625

PERMIAN BASIN

Two Important Strikes For TXL Area

MIDLAND.—Either a new field, producing from both Silurian and Ellenburger, or a 2½-mile south extension of the TXL field appears to be the likely result of two wells completed by Rowan Drilling Co. and Superior Oil Co.

Rowan's 2 Parker, 2½ miles south of the nearest Ellenburger well, flowed 123 bbl. in 1½ hours from Ellenburger pay at 9,625-73 ft., and then an average of 82 bbl. hourly from test of interval at 9,630-73 ft. Previously this well had shown for production in the Devonian, and flowed 81 bbl. hourly for 3 hours, 40° oil, from the Silurian at 9,419-8,500 ft. The 2 Parker is considerably higher structurally than the nearest Ellenburger well to the north, and may possibly be on a separate structure.

Meantime Superior's 7 Parker, a south offset to the above well, flowed 313 bbl. of 39.4° oil from Silurian pay on a 24-hour potential test, through 28/64-in. tubing choke from open hole at 8,470-8,535 ft., total depth, cutting 2 per cent basic sediment. Tubing flowing pressure was 25 psi. and casing 350 psi. This is the first Silurian completion in the field, since previous wells, while making oil on drill-stem tests from Silurian, were completed as either Devonian or Ellenburger producers.

Shell Oil Co., Inc., has made location for 1-O TXL, an 11,000-ft. test approximately ½ mile northeast of the Rowan well. Shell's test will also be a south offset to J. C. Barnes 1 TXL, a 10,000-ft. well, which was announced last week.

One mile farther south from the new area, American Republics Corp. 1 TXL, a wildcat, was testing what is believed to be the Wolfcamp in basal Permian, through perforations at 7,798-7,815 ft. It swabbed 28 bbl. of oil, 2 per cent mud cut, in 17 hours, after treating with both mud and regular acid. Additional perforations will be made at 7,793-98 ft. and at 7,815-25 ft., with acid treatment to follow, prior to making further tests.

In western Andrews County, Humble Oil & Refining Co. 1 Arthur Pinson had apparently defined the southern boundary of the Nelson field. It is now fishing for bit cones at 10,702 ft. in lime and chert, but previously had failed to show oil on drill-stem tests at levels low enough to test the Ellenburger possibilities. First test at 10,649-72 ft. recovered 10 ft. of drilling mud, and the second at 10,672-92 ft. recovered only 3 ft. of mud. Operator then

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ft., Ellenburger 10,265 ft., slight oil stain in cores at 10,208-219 ft.

Mitchell County: Doswell & Morgan 1 S. R. Coleman, Sur. 8, Cutbert Vacancy strip, elevation 2,247 ft., dry, TD 2,852 ft. in lime, water sand 270 ft.

Parmer County: Oil Well Drilling Co. 1 N. L. Tharp, Sec. 40, Blk. A, Capitol Syndicate Subd., 4½ mi. NE of Farwell, elevation 4,182 ft., dry, TD 7,511 ft. in pre-Cambrian, San Andres 2,720 ft., Cisco 6,800 ft., Strawn 7,190 ft., pre-Cambrian 7,275 ft.

Regan County: Humble Oil & Refining Co. 1-C Sawyer Cattle Co., Sec. 130, Blk. 1, T&P Sur., 10 mi. NE of Big Lake, elevation 2,586 ft., dry, TD 9,960 ft.; electric log tops: San Andres 2,060 ft., Strawn 9,300 ft., Ellenburger 9,850 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Sun Oil Co.'s 1-B McKinley, 20-18s-38e, was again considering going deeper after swabbing only 2 bbl. of oil in 14 hours. Tubing was rerun with the packer set at 7,525 ft., but it swabbed only load oil. Present depth is 7,658 ft., in dolomite.

In Eddy County, E. Orcutt 2 Kepple, 19-17s-27e, swabbed salt water after acid treatment. Total depth was 1,903 ft. in lime, plugged back to 1,810 ft. Grayburg Oil Co. 13-B Keeley, 26-17s-29e, was drilling below 2,515 ft. in lime. It topped the Grayburg zone at 2,220 ft. Harvey E. Yates 1 Yates estate, 32-18s-30e, had total depth at 3,995 ft., and shut down for pipe. M. W. Jones 1 Jones-State, 12-19s-27e, found a show of oil in lime at 2,700 ft., total depth, and was shut down for orders.

EASTERN TEXAS

Gas in Cotton Valley In Freestone County

DALLAS.—A new Cotton Valley gas zone held promise of additional gas reserves in Freestone County last week when The Texas Co.'s Smackover lime test encountered high gas pressures in the Cotton Valley at 11,285-335 ft. The deep test, 1 White, located 4 miles northwest of Fairfield, is drilling ahead below 12,893 ft., but danger of a blowout is said to be making drilling difficult. Leasing activity in southeastern Freestone County picked up last week when Humble Oil & Refining Co. purchased 4,000 acres north of the town of Oakwood on the west flank of the Longwood oil and gas field.

Two other exploration tests below 10,000 ft. last week are: Standard Oil Co. of Texas 1 New Birmingham, in Cherokee County, which was preparing to run a temperature test after setting 5-in. casing to 10,012 ft., and in Wood County, Humble Oil & Refining Co. 1 McKnight was drilling ahead below 10,396 ft.

Other wildcat reports included Magnolia Petroleum Co. 1 Hall, in Marion County, drilling below 8,302 ft. in sand and shale streaks; B. F. Phillips 1 Pickering, Shelby County, fishing drill pipe at 6,510 ft., total depth; and in Smith County The Pure Oil Co. 1 Christian was drilling below 5,520 ft. in sand and red shale.

EAST TEXAS SUCCESSFUL WILDCAT

Smith County: New oil field—Delta Drilling Co. 1 W. H. Boynton, J. J. Smith Sur., Abstract 882, 2 mi. SW of Mt. Sylvan, 1 mi. E of nearest production, elevation 528 ft., flowed 283.37 bbl. 33.3-gravity oil in 24 hours from Paluxy sand at 7,516-27 ft., perforated 7,512-28 ft., ¼-in. tubing choke, tubing pressure 175 lb., casing pressure 210 lb., GOR 158:1, TD 7,727 ft.

EAST TEXAS WILDCAT FAILURE

Wood County: Haynes B. Ownby, Trustee, 1 J. B. and E. L. Harry, J. Swift Sur., Abstract 542, 3½ mi. SW of Quitman, elevation 395 ft., dry, TD 5,510 ft., no shows, electric log tops: Midway 902 ft., Nacatoch 1,900 ft., Pecan 2,777 ft., Austin 4,561-4,698 ft., sub - Clarksville 4,777 ft.

ROCKY MOUNTAIN

Tensleep Production Found at Quealey Dome

DENVER.—A discovery in a deeper pay, the Tensleep, on the Quealey dome, Albany County, Wyoming, in California Co. 2 Holst, SW NE SE 13-17n-77w, marked the closing week of 1946. The California Co., sole operator, opened up the pool in 1934, and at the close of 1945 had 16 wells on production, of which 4 were flowing under hydrostatic pressure, from the Dakota, Lakota and Sundance sands. Production to the end of 1945 was 1,953,000 bbl. of light oil. The structure is on the east slope of the Medicine Bow range, and is a small, sharply folded elongated dome covered entirely by alluvin and terrace gravel, and was the first producing structure in the Rocky Mountain area defined exclusively by the seismograph. The producing area in the upper horizons is limited to approximately 160 acres.

The 2 Holst well completed in 1935 in the Dakota after plugging back from the Morrison at a total depth of 4,207 ft., was drilled deeper to test the Tensleep. It had the top of that formation at 5,480 ft., and was drilled to 5,675 ft. Good saturation was encountered in the top of the sand, and on a drill-stem test oil rose 3,400 ft. A deeper test also showed saturation, but some water appeared at the bottom. The 7-in. was cemented on bottom at 5,657 ft., and the well will be tested progressively through perforations. The crude is black and approximately 22° gravity.

Elk Basin test completed.—Stanolind Oil & Gas Co. 38-M Unit, NE SE NE 24-58n-100w, a discovery in the Madison lime last September, has been listed officially as a completion at a total depth of 5,013 ft., flowing 247 bbl. of 30.2° oil in 24 hours through a ⅜-in. choke with a flowing tubing pressure of 90 psi. and casing pressure of 285. Top of the Madison, electric survey, was at 4,340 ft., 380 ft. below the top of the Tensleep, previously the deepest producing horizon. Elevation is 4,503 ft. Location is on the top of the structure. Final test was from lower section of the Madison after acidizing with 2,000 gal. Best saturation was in the upper section which was cased off at 4,680 ft., leaving 340 ft. of saturated pay behind the pipe. The well was drilled to the Tensleep and produced by Continental Oil Co. until Stanolind took over the operation of the field under a unit agreement.

Big Sand Draw extension.—Sand Draw Oil Co. 1-T South Sand Draw Unit, NE SW NE 26-32n-95w, Fremont County, Wyoming, which marks a mile extension of the Big Sand Draw gas field in the Frontier or the opening of a new pool, was estimated at 20,000,000 cu. ft. of gas per day on the basis of short tests before shutting down for the winter. The gas is coming from the first, second, and fifth sands in the Frontier. Two more sands in that formation remain to be tested. Whether it will be completed at this depth or carried on down to the Tensleep, the original objective, has not yet been determined. The Sinclair-Wyoming Oil Co. Tensleep oil sand wells are located 2½ miles to the north.

The new well is located on the edge of a large mesa 6,864 ft. above sea level with a covering of 900 to 1,200 ft. of Wasatch (Tertiary) formation above the floor of the plateau in which the oil and gas field to the north is situated. For this reason the axis of the structure has never been fully determined and several holes were drilled to 2,500 ft. to work out the formations before spotting the new test. Total depth of the well is 4,644 ft., top of Frontier formation, 3,755 ft. The 9⅝-in. was set on bottom before shutting down.

Madison lime in Cut Bank.—Carter Oil Co. 1 M. F. Brown, SE NE 24-36n-6w, an outpost on the west side of the southern group of Madison lime producers in North Cut Bank field, has been completed after several months of experimental work and testing. It was completed at 3,087 ft. after plugging back from a total depth of 3,157 ft. for 1,000,000 cu. ft. of gas, estimated, through perforations at 3,121-30 ft. It was then shut in and all producing zones were squeezed off and the well is not open for production. It was drilled to 3,157 ft. last September, and after plugging back to 3,148 ft. was tested for oil, the best showing being 33 bbl. natural in 24 hours. It was then plugged back to 3,087 ft. where final tests were made after squeezing off the oil horizons. The electric survey tops are Colorado, 556; Kootenai, 2,328; Cut Bank, 2,890; Ellis, 2,916; Madison, 3,062. Elevation, 4,036 ft., rotary table.

New operations.—Eleven new operations were reported, of which 4 were in the Rangely field in Colorado; 3 in the Frannie field in Wyoming; one each in Cut Bank, Bowdoin, and Kevin-Sunburst, in Montana, and one in Fulcher Basin in northwest New Mexico. All are development wells.

Completions.—Thirteen wells were completed, of which 10 were oil wells with initial production of 3,209 bbl., and 3 were gas wells. These were distributed as follows: 7 in the Rangely field, 1 in Elk Basin in Wyoming, 4 in Montana, of which 2 were oil wells in Cat Creek and Kevin-Sunburst, and 2 gas wells in Bodwoin and Cedar Creek; and one gas well in Fulcher Basin, San Juan County, New Mexico.

WYOMING SUCCESSFUL WILDCAT

Elk Basin, Park County: New deep pay—Stanolind Oil & Gas Co. 38-M Unit, NE SE NE 24-58-100, old Tensleep producer deepened to Madison, TD 5,013 ft., top of Madison 4,340 ft., set 865 ft. 5½-in. liner at 4,680 ft., squeezed off saturation in upper section, flowed 247 bbl. in 24 hours, after acid, 2,000 gal.

MISSISSIPPI

Holmes County Test Drilling Ahead

JACKSON.—Skelly Oil Co.'s lower Cretaceous test 2½ miles southeast of Beelake in Holmes County, the 1 W. M. Spann, SW SE 22-14n-1w, on last report was drilling below 6,463 ft. after recovering sand and gravel in cores at 6,206-19 ft. In Sharkey County, 1 mile east of Blanton, J. Willis Hughes 1 Houston estate, NE NE 4-10n-7w, a Tuscaloosa test, had no shows of oil and was drilling below 3,616 ft. in sandy shale. In Washington County, 1 mile southwest of Swiftwater, Armond Corp.'s 1 D. Wynn, NE SE 12-17n-8w, found top of the Tuscaloosa at 4,645 ft., on an elevation of 128 ft., derrick floor, and was drilling ahead at 5,485 ft. in sand and shale. It is scheduled to go to 6,000 ft.

Some wildcat tests are active in Alabama, with quite a number spudded in but shut down for rig, or lack of materials. In Fayette County, approximately 8 miles east-southeast of the town of Fayette, W. M. Dalton 1 Morris White, NW SE NE 21-16s-11w, was drilling at 2,566 ft. in hard sand. An earlier drill-stem test at 1,672-86 ft., open 1 hour and 15 minutes, recovered 400 ft. of fresh water through ⅜-in. chokes, top and bottom. The test found a coal seam at 2,239 ft., but thickness was not reported.

Other explorations showing activity in-

cluded Harry L. Cull et al 1 H. B. Lewis, SE NE SE 23-11s-14w, in Marion County, shut down temporarily for repairs at 564 ft. in sand. In Talladega County, approximately 3 miles southeast of Sycamore, Ben E. Lamb 1 Harper, NE SE 35-20s-4e, was moving in cable tools for a wildcat test. In Winston County, Glen D. Page 3 First National Bank of Birmingham, SW SE 7-12s-8w, reported a show of gas at 1,380 ft., and a show of oil at 1,450 ft. It drilled ahead to 2,005 ft. and was shut down on last report.

MISSISSIPPI WILDCAT FAILURES

Forrest County: Morgan-Norton 1 U. S. A., SE SW 15-1s-13w, dry, TD 9,504 ft., Marine Tuscaloosa 7,563 ft., Basal Marine Tuscaloosa 8,015 ft., Massive sand 8,300 ft.

Hinds County: Kingwood Oil Co. 1 W. G. Plummer et al, S/2 NW SW SW 14-5n-1w, dry, TD 3,200 ft., no tops reported.

Jefferson County: Humble Oil & Refining Co. B-1 Gordon, 44-9n-1w, dry, TD 11,379 ft., no tops reported.

Lincoln County: Humble Oil & Refining Co. 1 Lincoln County Board of Supervisors, NW SE NE NE 16-8n-5e, dry, TD 10,818 ft., no tops reported.

FLORIDA WILDCAT FAILURE

Collier County: Humble Oil & Refining Co. 2 Lee Cypress, SW NE SW SE 28-47s-29e, dry, TD 1,175 ft., no tops reported.

LA.-ARK.

Paluxy Oil in DeSoto Parish Test

SHREVEPORT.—In DeSoto Parish, 1½ miles west of Gloster, F. A. Callery et al 1 B. C. Strauss, S½ NE NW 19-14n-14w, may be good for a 75-bbl. well. The test had total depth of 7,084 ft. in Travis Peak, but was plugged back to 4,080 ft. and perforated at 4,070-78 ft. in the Paluxy. On 12-hour swabbing tests, it made up to 75 bbl. of fluid, containing as high as 80 per cent 46° oil, and the balance slightly brackish water and mud. After swabbing, fluid stood 1,000 ft. from the top, and shut in overnight, casing pressure built up to 700 lb. When opened, it flowed by heads.

O. A. Kinard 1 Ayer Timber Co., NW SW SW 19-15n-10e, in Madison Parish, 12 mi. south of Delhi, elevation 78 ft., has following sample tops, according to reports; Wilcox 2,257 ft. and Midway 3,860 ft. This well is scheduled as a 6,000-ft. Paluxy test.

In Arkansas, McAlester Fuel Co.'s 1-A R. S. Warnock, NW NE 6-17s-19w, 2½ miles north of the Magnolia field, Columbia County, was shut in to build storage. Total depth is 7,417 ft. in the Smackover. Before shut in the well was making approximately 1,500,000 cu. ft. of gas a day through ¼-in. tubing choke, with an estimated 30 to 40 bbl. of water-white disare at 7,412-15 ft.

North of the Wesson field, Ouachita County, A. B. Turner et al 1 Girvis Haltom, SW NW NW 18-15s-18w, scheduled to test the Travis Peak at 4,000 ft., was shut down at 2,380 ft. in sand, and waiting on rig. A show of oil in the Blossom sand at 2,121-30 ft. was not tested.

NORTH LOUISIANA WILDCAT FAILURES

Bossier Parish: G. H. Pierce 1 Levy, NE NW SW SE 7-19n-11w, dry, TD 693 ft., Arkadelphia 395 ft., Nacatoch 684 ft., Porous sand 688-93 ft.

Franklin Parish: Big Chief Drilling et al 1 M. Bradley et al, C SE SE NW 35-14n-8e, dry, TD 6,915 ft., Wilcox 2,421 ft., Midway 4,276 ft., gas rock 4,806 ft., Tuscaloosa 5,660 ft., 1st sand 5,690 ft., Lower Cretaceous 6,498 ft.

Ouachita Parish: The California Co .1 Breece Lbr. Co. C NW NE 3-17n-5e, dry, TD 3,271 ft., Midway 1,920 ft., gas rock 2,360 ft., Tuscaloosa 2,470 ft., no Paluxy present, anhydrite 3,260-69 ft.

Richland Parish: Lewis & Stewart 1 Noble, 12-15n-5e, dry, TD 4,271 ft., gas rock 2,377 ft., Ozan 2,434 ft., Tuscaloosa 2,524 ft., Paluxy 3,256 ft., Glen Rose lime 3,772 ft., anhydrite 4,250 ft.

Winn Parish: H. L. Hunt et al F-134 Goodpine, S NW SE 9-13n-5w, dry, TD 8,016 ft., Massive anhydrite 6,304 ft.

ARKANSAS WILDCAT FAILURES

Calhoun County: Jack Carnes et al 1 Burks, C NW SW SE 25-13s-16w, dry, TD 3,141 ft., Arkadelphia 1,490 ft., Nacatoch 1,580 ft., Meakin 2,045 ft., Cotton Valley 2,762 ft., Eagle Mills 2,940 ft., no Smackover lime present.

Union County: Lion Chemical Corp. 1 Zanell, C NW NE NE 34-18s-13w, dry, TD 2,718 ft., Midway 1,730 ft., Arkadelphia 2,100 ft., Nacatoch sand 2,383-90 ft., Saratoga 2,420 ft., Base Annona 2,594 ft., Graves 2,711 ft.

MICHIGAN

Gas Drilling Dominates Current Activity

SAGINAW.—There was not a single oil producer on the list of 16 completions for the week in Michigan. Initial of slightly over 20,000,000 cu. ft. was recorded for the four gas wells on the list. Five of the 12 dry holes were wildcats and all were shallow wells, deepest hole of the 16 being

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a wildcat failure at 2,915 ft. in Ionia County. New operations also were restricted, only 8 locations being announced. Two each were in Arenac and Allegan counties, 1 each in Barry, Bay, Montcalm and Osceola.

MICHIGAN WILDCAT FAILURES

Allegan County, Dorr Township: Charles W. Cook 1 Belfoort, NW NE NW 17-4n-12w, dry in Traverse limestone, TD 1,673 ft.

Ionia County, Lyons Township: Oil Producers, Inc., 1 Cook, NW NW NW 11-7n-5w, dry in Dundee, TD 2,915 ft.

Montcalm County, Belvidere Township: Leslie T. Barber 1 Sagendorf, NW SW SE 27-12n-7w, dry in Marshall, TD 1,312 ft.

Winfield Township: Ide Oil & Gas Corp. 1 Itzenhouser, NW SE SE 36-12n-8w, dry in Marshall, TD 1,212 ft.

Ottawa County, Blenden Township: Rex Oil & Gas Co. 1 Zuwerink, NE NE SW 29-6n-14w, dry in Traverse limestone, TD 1,657 ft.

CANADIAN FIELDS

N. Extension to Turner Valley Getting Play

CHATHAM.—In the Turner Valley north extension, Home Millarville 23, LSD 7, 5-21-3w5, an outpost well to the west, has been completed with initial production of 289 bbl. daily from the Madison limestone at 8,350-8,800 ft. Home-Millarville 24, LSD 12, 33-20-3w5, a west flank test in North Turner Valley, drilled Madison limestone from 7,891-8,375 ft., found two thick porous zones and is testing. Home-Millarville 26 is standing in LSD 15, 18-21-3w5, to test a new extension area north and west of previous production.

Kinsella.—In the Kinsella field, east-central Alberta, Imperial-Kinsella 19, LSD 10, 28-45-9w4, is rigging for a definite test of the oil possibilities of this section of the field. Location is immediately north of Imperial-Kinsella 14, LSD 7, same section, which last spring encountered near-commercial showings of 28° oil at 2,048 ft. but had to be abandoned owing to drilling difficulties. An interesting feature of the showing was that the crude was much lighter than the asphaltic crudes, ranging from 14 to 18 gravity, developed in the Wainwright, Vermilion and Lloydminster fields in the Alberta plains area; and more nearly resembled the oil encountered in the Provost field, farther south and east. Imperial-Kinsella 23, LSD 10, 10-48-12w4, is finishing at 2,215 ft. with indications of a good gasser, and No. 25 is drilling.

Spirit River.—An additional reservation of 731,085 acres has been secured by Imperial Oil in the Spirit River area of northwestern Alberta, close to the British Columbia boundary. The acreage is in townships 71-74, Ranges 3-10, and increase Imperial holdings in the northwest portion of the province to 1,319,115 acres, extending from a point north of Spirit River to Grande Prairie on the south. Drilling operations will probably be started next spring, though much roadbuilding will be required to make potential locations accessible.

Lloydminster.—Official figures on recent Lloydminster completions show that Marina 2, LSD 9, 27-49-1w4, was finished at 1,919 ft. with 15 bbl. daily initial production. Patricia 2, LSD 16, 1-49-1w4, at 1,895 ft. had 25 bbl. daily. On the Saskatchewan side of the field, Community Services, LSD 5, 10-50-26w3, to the east and north of the field, has been drilled below the Cretaceous horizons to the lime for a deep test.

Watford.—In the Watford district, Lambton County, Ontario, recent attempts to revive and extend the small shallow oil field opened shortly before the war have so far been unsuccessful.

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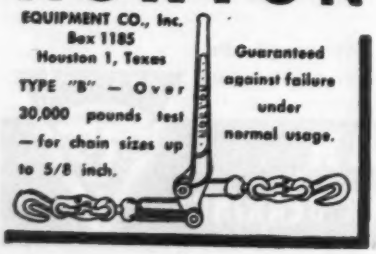

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CALIFORNIA

Exploration Increasing In Edison-Mountain View Area

LOS ANGELES.—Recent field developments of a favorable nature in the Edison-Mountain View area in Kent County have had a noticeable effect on prospecting activity. Major company interest has been lacking until this week when Union Oil Co. staked location for 74-28 Porter in 28-30s-29e, midway between the Edison and Mountain View fields. Location is about ¼ mile southwest of Continental Oil Co. 1 Porter, abandoned last July at 4,700 ft. The latter well drilled into basement at 4,674 ft. Three miles to the southeast Jergins Oil Co. has made a location for a wildcat. 1 Bigelow in 1-31s-29e.

Reports persist in the field, without official confirmation, however, that Belridge Oil Co. has made a deep sand discovery in its 62-W-33, in the South Belridge field. The well is said to have flowed for several days from an undisclosed interval in Point of Rocks formation. No details are available as the operator declines comment. Total depth is 13,975 ft., and scout reports put the producing interval near bottom.

Other deep tests in Kern County made good footage during the week. Richfield Oil Co. has reached a depth of 13,845 ft. in 21-33 C.L.-A in the Coles Levee field. Richfield is exploring for production below the already productive Stevens sand. Similarly, in the Ten Section field, Shell Oil Co. is prospecting for a deep sand below the Stevens in its 53-30 K.C.L.-A, now drilling at 11,867 ft.

Pacific Western Oil Corp. made little progress during the week in recovering drill pipe fish in its world's record well, 1 National Royalties in 5-26s-22e, east of the Lost Hills field. With total depth 16,668 ft., drill pipe has been recovered to 11,495 ft.

Shell Oil Co. has extended the Trico gas field in Tulare County a short distance to the northeast through the completion of its 1 Alpaugh Unit in 7-24s-23e. On a recent test of gun perforated interval 3,237-77 ft., the well produced at a rate of 5,000,000 cu. ft. per day. Two additional wells have already been programmed for this lease which consists of many small parcels leased from truck farmers in the vicinity of the town of Alpaugh.

In the Los Angeles Basin, Richfield Oil Corp. 3 Union Pacific Unit, in the East Los Angeles field, began to look like a producer when a formation test of the interval 8,337-65 ft., resulted in the recovery of 4,215 ft. of clean oil. The No. 1 well on this lease was the discovery well of the field. No. 2 drilled last summer, was a failure.

A second completion in the new Alondra field on the south side of Los Angeles was delayed when British-American Producing Co. 1 Alondra Park, 22-3s-14w, tested wet with water coming from formation below the shoe. Well is bottomed in oil conglomerate.

Considerable wildcatting interest is evident north and east of the Oak Canyon field in the direction of the town of Castaic. Four test wells are to be drilled in an area which has seen little wildcatting in recent years.

In Orange County, near the town of Fairview and about 5 miles west of the Huntington Beach field, Bandini Petroleum Co. is staking location for a wildcat. Site is about 1 mile from any previously drilled test hole.

CALIFORNIA UNSUCCESSFUL WILDCATS

Kern County: Independent Expl. Co. 53 Cymric, 21-29s-31e, dry, TD 3,417 ft.

Amerada Pet. Corp. 55-15 S.P., 15-29s-29e, dry, TD 2,199 ft.

Standard Oil Co. 46-33w W. P., 33-29s-21e, dry, TD 7,658 ft.

Orange County: Amerada Pet. Corp. 63-7 Anaheim-Sugar, 7-6s-10w, dry, TD 5,550 ft.

OHIO, KENTUCKY

Salt Creek Township Gets First Large Clinton Well

COLUMBUS.—The first large Clinton sand gas well to be found in the north central part of Salt Creek Township, Muskingum County, was drilled in by John Morrow et al on the Roseville Pottery Inc. in Section 10. Top of the sand was reached at 4,175 ft. and at 4,198 ft., where drilling was stopped, the well gaged 3,000,000 cu. ft. with a rock pressure of 1,240 lb.

The Clinton sand gas pool between Deavertown and Tropic was extended a location south and east by the Ohio Fuel 1-C L. H. Gregg, Section 35, York Township, Morgan County. Clinton sand from 3,795-3,833 ft. gaged 265,000 cu. ft. natural from 13 ft. of pay and 12 hours after shot gaged 1,120,000 cu. ft.

Harry Dempsey drilled deeper his Newburg sand well on L. C. Porter, Lot 15, Richfield Township, Summit County. Red Clinton sand at 3,530-59 ft. made 1,914,000 cu. ft. natural and shut in at 2,300,000 cu. ft. after shot with a rock pressure of 900 lb. This was the only Newburg well in a northeast extension to the Hinckley field.

Nollem Oil & Gas 2 J. O. Smith, Section 1, Bedford Township, Meigs County, at the south tip of the Hemlock Grove pool made 75 bbl. along with 300,000 cu. ft. gas in 24 hours after shot. Berea sand was topped at 1,651 ft. and drilled to 1,657 ft. This is the best well completed in the south extension to the pool.

Twenty-one locations were reported for the week with six in Stark County, four in Muskingum, two each in Lorain and Ashland, and one each in Meigs, Summit, Wayne, Tuscarawas, Noble, Monroe, and Washington counties. Twenty-four wells were completed, 18 producers and 6 dry.

OHIO WILDCAT FAILURES

Lorain County, Huntington Township: Ohio

Fuel Gas 1 Edward Sanderson, Lot 24, no Clinton, TD 2,730 ft.

EASTERN KENTUCKY ACTIVITIES

ASHLAND.—No completions were noted in the eastern Kentucky field during the week. Locations were marked on the J. E. Maynard farm, Pike County; Neal Roberts farm, Pike County; Wm. L. Keesee farm, Pike County.

WESTERN KENTUCKY

OWENSBORO.—Only one completion was reported for the western Kentucky area during the past week. It was the Sinclair-Wyoming 4 J. L. Chandler, 3-N-23, in the Poole field of Henderson County, which was completed in the Hardinsburg sand at 2,030-45 ft., total depth, for 10 bbl. of oil daily and a show of salt water. Three new operations, all in Henderson County, were announced during the week.

Exploratory tests now under way in the area include the J. W. Carter et al 1 Green Heirs, NW SW SW 7-P-20, rigging up rotary; Ryan Oil 1 L. R. Waitman, 6-P-29, moving in rotary tools, and the Carter Oil Co. 1 L. Cottingham, 23-O-23, drilling at 715 ft.

INDIANA

EVANSVILLE.—A slowdown in activity due to the holiday season was noticeable in Indiana during the past week, as only three well completions were reported. These included a dry hole in the North Owensville field in Gibson County and two oil wells in Posey County. Four new operations were announced during the week, one each in Gibson, Knox, Vigo and Posey counties. The new well in Vigo County, Collins Brothers 1 Kendall, NW NW NW 27-10n-9w, is a wildcat test which is scheduled to go to the Devonian at about 2,400 ft.

Wildcat tests under way in Indiana at the present time include the Superior Oil Co. 1 J. Hardiman, NE NW 18-2s-11w, drilling at 2,088 ft.; W. R. White et al 1 Edward Martin, NW SW NW 17-4s-11w, shut down at 1,256 ft.; Calvert & Willis 1 Henry Rickens, NE NW 18-5s-13w, drilling at 3,000 ft., and the Roy Meyers 1 L. M. Thomas, NW SE SE 19-9n-10w, rigging up cable tools.

ILLINOIS

New Benoist Sand Field Opened in Clay County

MATTOON.—A new Benoist sand field about 1½ miles north of the Kenner field in Clay County has apparently been opened by the National Associated Petroleum Co. at the 1 N. O. Golden, SW NE SW 17-3n-6e. Prior to shot, this well swabbed at the rate of 1½ bbl. of oil an hour. Operators are now cleaning out following a 10-qt. shot in the Benoist at 2,758-63 ft. and the well is reportedly swabbing at the rate of 4 bbl. of oil an hour. A north offset, the 2 N. O. Golden, is drilling at 1,440 ft., and other operations are expected to get under way in the near future.

Also in Clay County, National Associated 1 Oak Hinkle, SE NW NE 33-3n-7e, is showing promise of extending the East Flora pool a short distance to the southeast. Pump is now being installed to test the McClosky lime at 3,042-47 ft. following an acid treatment of 1,000 gal.

Still another apparent success of National Associated is the 1 E. Tidball et al, NW NE NW 23-1s-8e, which extends the South Mount Erie pool about 1 mile to the south. This test originally swabbed 37 bbl. of oil and 56 bbl. of salt water from the Rosiclare at 3,142-46 ft., total depth 3,188 ft. Following failure to eliminate the water, the test was plugged back to a depth of 3,120 ft., where casing was perforated with 50 shots opposite the Levias at 3,089-3,102 ft. An acid treatment of 1,000 gal. was then made, and the well swabbed at the rate of 126 bbl. of oil in 14 hours.

In White County, Tom L. Smith is preparing to perforate pipe opposite the Aux Vases sand at 2,900-12 ft. in the 1 Ethel Collins, SE NE 29-6s-10e. The well was drilled to a total depth of 3,045 ft., and in addition to the Aux Vases saturation, encountered three pay streaks in the McClosky between 2,974 and 3,034 ft. An acid treatment of 6,000 gal. was made in the McClosky and the test swabbed at the rate of 20 bbl. an hour while cleaning out. It is the first well to be drilled in the townsite of Concord.

ILLINOIS SUCCESSFUL WILDCATS

Clark County: Collins Bros. 1 Baker, NE NE SE 36-10n-14w, pumped 5 bbl. oil and 30 bbl. salt water per day, Casper sand 1,326-36 ft., TD 1,572 ft.

ILLINOIS WILDCAT FAILURES

Hamilton County: F. L. Strickland 1 T. L. Karcher, NW NW SE 12-4s-5e, dry at 3,453 ft., Glen Dean 2,720 ft., Barlow 2,960 ft., Ste. Genevieve 3,324 ft.

White County: Magnolia Petroleum Co. 1 J. A. Puntney, N½ NE NW 19-3s-10e, elev. 383 ft., dry at 3,405 ft., Glen Dean 2,688 ft. Ste. Genevieve 3,272 ft., Levias 3,288 ft., Rosiclare 3,315 ft., McClosky 3,346 ft.

KANSAS

Morris County Wildcat to Test Oil Shows in Viola

A. J. BRAZIL and Newton Oil Co. have cemented 7-in. casing at 2,499 ft. to test shows of oil encountered in the top of the Viola lime at their 1 Wiggins, SW NW SE 18-16s-6e, Morris County. The test, located approximately 9 miles east of the North Lost Springs pool of Dickinson County, logged the top of the Viola at 2,499 ft. and a 7-ft. core below that depth showed oil and gas. Only oil production in Morris County at present comes from the small Nelson pool in the southwest corner of the county. All other production is gas and is found in the south central part of the county.

Marion County, scene of one of the most intensive exploratory campaigns in Kansas, received a new wildcat test during the past week when drilling operations were begun at the Kiowa Drilling Co. 1 Weinbrenner, NE NE NW 36-19s-1e. The test is approximately 2 miles east of the LeHigh pool, and is a joint venture of Kiowa and the Bay Petroleum Co. The two companies have communitized a core-drilled block of 1,000 acres.

Preparations are being made to drill plug at Kingman County's prospective discovery, the Plains Exploration 1 Swander, SW SE SW 20-28-9w, 11 miles southeast of the Cunningham field. On a drill-stem test made last week, the well flowed oil into the pits for 28 minutes at a rate estimated to be in excess of 1,000 bbl. daily. Following the test, made at 4,407-12 ft. in the Viola, the hole was deepened to 4,558 ft., 4 ft. in the Arbuckle, and casing set at that depth. No shows were reported below the Viola, however.

KANSAS SUCCESSFUL WILDCAT

Barber County: Continental Oil Co. 1 Smith, NW NW NW 21-33s-12w, flowed 1,405 bbl. of 26.4°-gravity oil per day from Simpson sand at 4,857-93 ft., through ¾-in. choke, Lansing-Kansas City 3,872 ft., Mississippi lime 4,572 ft., chat 4,689 ft., Misener 4,735 ft., Viola 4,738 ft., TD 4,893 ft.

KANSAS WILDCAT FAILURES

Barton County: Sohio Petroleum and Ferrell Drilling 1 Ochs, NE NE NW 10-16s-13w, dry, TD 3,398 ft., anhydrite 838 ft., Topeka 2,788 ft., Heebner 3,016 ft., brown lime 3,072 ft., Lansing-Kansas City 3,098 ft., Basal Kansas City 3,354 ft., conglomerate 3,366 ft., Arbuckle 3,378 ft.

Ellis County: Mazda Oil 1 Henderson, SW SW SW 27-11s-18w, dry, TD 3,735 ft., anhydrite 1,392 ft.

Jefferson County: Una Oil 1 Griffits, SW NW NW 2-10s-17e, dry, TD 2,185 ft., Pennsylvania sand 1,207 ft., Mississippi lime 1,692 ft., Hunton 2,160 ft.

Pratt County: Cities Service Oil and Continental Oil 1 Long, NE NE SW 2-26s-13w, dry, TD 4,410 ft., brown lime 3,687 ft., Lansing-Kansas City 3,721 ft., Basal Kansas City 4,013 ft., conglomerate 4,149 ft., Viola 4,207 ft., Simpson sand 4,280 ft., Arbuckle 4,368 ft.

Lion Chemical Corp. 1 Verning, NE SW SE 30-27s-14w, dry, TD 4,785 ft., brown lime 3,959 ft., Lansing-Kansas City 3,986 ft., Basal Kansas City 4,326 ft., conglomerate 4,395 ft., Mississippi lime 4,463 ft., Viola 4,563 ft., Simpson sand 4,642 ft., Arbuckle 4,734 ft.

Sedgwick County: Beech Aircraft Corp. 1 E. L. Crabb, NW NE NW 31-26s-2e, dry, TD 2,991 ft., Kansas City 2,508 ft., sand 2,760 ft., sand and chat 2,981 ft., Mississippi lime 2,985 ft.

OKLAHOMA

Rich Cromwell Sand Strike Near Wetumka Indicated

CONSIDERABLE excitement was created at the close of the past week when the Texola Drilling Co. et al reported a rich strike at their Hughes County wildcat, the 1 Meadors, NE NE NW 31-9n-11e. The wildcat, located north of the Greasy Creek pool and due north of Wetumka, picked up the Cromwell oil sand at 3,090-3,110 ft., and on a drill-stem test at that depth it showed gas in 3 minutes and oil in 10 minutes. It then headed up and flowed at an estimated rate of 75 to 100 bbl. of oil daily along with 2,000,000 cu. ft. of gas. Casing has been run to 3,096 ft. for a production test.

The new discovery well is located on a short-term farmout from Phillips Petroleum Co., and the majority of the undrilled acreage in the area is held by O. H. Grimes of Tulsa, and W. B. Pine, Jr., of Okmulgee. Grimes has already started the first offset at the 1 Crawford, SE SE SW 30-9n-11e.

Standard of Kansas has extended the Sylvian pool of Seminole County to the south with their 1 Roberts, SW SW SE 15-10n-7e. Final gage of the well was 16 bbl. of oil per hour through a 5/16-in. choke. First Gilcrease sand was logged at 3,515-23 ft., and the lower Gilcrease at 3,548-58 ft. Standard has three locations in the area and is moving in tools for an immediate start at two of these.

Some of the more prominent wildcats which are still in various stages of drilling as the year closes include Superior 51-11 Weller, NW NW NE 11-8n-12w, in central Caddo County near deepest part of Anadarko basin, which is now drilling slowly ahead below 16,350 ft. Final depth of this well may be below the 17,000-ft. mark in Ordovician beds. In Dewey County in the western part of the state, Magnolia Petroleum Co. 1 Winter, SW NE 9-19n-20w, is below 7,300 ft, and drilling ahead toward the scheduled 10,000-ft. contract depth. In Major County, the R. Olsen 1 Ott, SW SE 4-21n-9w, may open the first new pool of the new year. This well recovered 11,700,000 cu. ft. of gas and about 30 ft. of 53°-gravity distillate in a test of the Wilcox at 8,015-8,124 ft. and production tests to evaluate the show are expected within the week.

OKLAHOMA WILDCAT FAILURES

Cotton County: Bridwell Oil 1 Odle-Pah-

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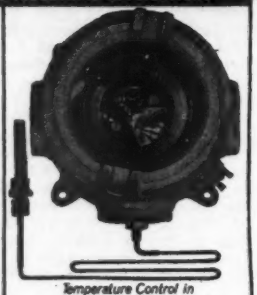

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DA (Double Adjustment) Temperature or Pressure Controls are used extensively on industrial applications. The outside double adjustment facilitates the control operating range setting. The calibrated dial plainly indicates the desired setting. All guesswork is eliminated. No cover to open or remove when making control adjustments. A locking device is provided to prevent tampering. Various ranges available.

The hermetically sealed mercury switches are dust and corrosion-proof. There is no open arcing, pitting or sticking of contacts. These switches assure better control performance and longer control life.

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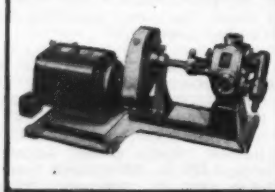

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Quote, SW NW NE 12-5s-13w, dry, TD 2,520 ft., sand 1,584-90 ft., 1,755-73 ft., 1,926-60 ft. and 2,026-46 ft.

Akin & Dimock 1 Landers, SW SW NE SE 32-4s-13w, dry, TD 2,120 ft., no sands.

Bridwell Oil 1 Mary Beck et al, C NE NW 32-3s-10w, dry, TD 1,702 ft., sand 1,142-52 ft., 1,340-46 ft., 1,366-82 ft., 1,408-20 ft. and 1,685-98 ft.

H. B. Wilderson et al 1 Dickenson, NW SE SW 17-3s-10w, dry, TD 1,512 ft., no sands.

W. A. Clark, Jr. 1 Stuckey, NW NE NE 15-2s-14w, dry, TD 2,255 ft., sand 1,315-31 ft., lime 1,368-90 ft., Granite Wash 1,525-38 ft., lime and chert 1,980-2,038 ft.

Hughes County: Yancey & Harris 1-A Washburn, NW NW NW 22-8n-9e, dry, TD 3,025 ft., Lower Wewoka 560 ft., Calvin 722 ft., Senora lime 1,178 ft., Thurman 1,610 ft., Inola lime 2,150 ft., Bartlesville 2,326 ft., Booch 2,732 ft., Gilcrease 2,988 ft.

Kay County: Kansas-Oklahoma Oil & Gas 1 Davidson, NW NW NW 15-29n-1e, dry, TD 3,460 ft., chat 3,427 ft.

Lincoln County: Mealy-Wolfe and B. H. Crawford 1 Hoepken, SW SW SE 22-14n-3e, dry, TD 4,205 ft., Pawhuska 1,320 ft., Avant 2,850 ft., Hogshooter 3,120 ft., Layton 3,230 ft., Checkerboard 3,455 ft., conglomerate 3,495 ft., Prue 4,151 ft.

Okfuskee County: Bryan Petroleum 1 Sene Duffer, SW SW NE 10-13n-7e, dry, TD 3,620 ft., Layton 1,410-512 ft., conglomerate 1,890-900 ft., Prue 2,704-40 ft., brown lime 3,420 ft., Dutcher 3,495 ft.

Oklahoma County: A. R. Jordan 1 Barnett, SW SW SW 13-14n-1w, dry, TD 5,976 ft., Sylvan 5,612 ft., Viola 5,714 ft., 2nd Wilcox 5,966 ft.

Continental Oil et al 1 H. P. Suenram, C SE NE 10-13n-3w, dry, TD 6,606 ft., Pawhuska 3,309 ft., Oread 4,279 ft., Tonkawa lime 4,417 ft., Avant 4,848 ft., Hogshooter 5,362 ft., Big lime 6,063 ft., Sylvan 6,580 ft.

Tillman County: Midland Oil 1 Emery, SE NE NE SE 36-4s-14w, dry, TD 1,652 ft., sand 1,464-503 ft., Megargle lime 1,520-35 ft., sand 1,612-47 ft.

Whittaker & Britton 1 C. A. Gittings, NW NW NW 15-4s-14w, dry, TD 2,010 ft., sand 2,000-06 ft.

Court Rules Stored Oil Interstate Commerce

TRENTON, N. J. — Oil products stored temporarily by Socony-Vacuum Oil Co., Inc., prior to transfering them to New York for refining are not taxable by the Borough of Edgewater, the New Jersey Supreme Court ruled last week.

The court upheld a decision of the State Division of Tax Appeal that the oil was in interstate commerce and constituted no part of the "taxable personal property of the borough." Edgewater had assessed stored oil for $26,500 in 1943 and for $11,000 in 1944.

Reference Report Issued

A two-volume reference report on oil and gas fields of North Louisiana, South Arkansas, Mississippi, and Alabama has been issued by the Shreveport Geological Society. The books were assembled and published by a 24-member committee headed by T. H. Philpott, of Carter Oil Co., president of the society.

A.G.A. Review Points to Natural-Gas Expansion

THE natural-gas industry continued to grow at an accelerated pace during the year 1946 and now serves an area with a population of 41,000,000 in 33 states through its network of 220,000 miles of trunk lines and mains, R. H. Hargrove, president of the American Gas Association, said in his annual review of the entire industry.

With total assets of more than $4,000,000,000, the natural-gas industry has advanced from 41 to 48 per cent of the number of customers served by all types of gas, Hargrove continued. The natural-gas industry's production is 4 trillion cubic feet, including other than utility sales, with a market volue of $850,000,000.

As for the gas industry as a whole, Hargrove said it completed 1946 with an enviable record, setting all-time records in every category with the exception of industrial sales which leveled off from wartime peaks as a reflection of general unsettled business conditions. "More people used gas than ever before, and more innovations in gas appliances appeared on the market than in any year in the past decade," he said.

Pipe Lines Involve $120,000,000

The A.G.A. president, who is vice president and general manager of United Gas Pipe Line Co., Shreveport, La., mentioned approval of many new long-distance pipe-line construction projects in his discussion of natural-gas expansion. "A new 1,200-mile line from Texas to California with a capacity of 305,000,000 cu. ft. per day is now being built at a cost of $70,000,000," he continued. "Other pipe-line projects approved and under way this past year involve a total additional mileage of 2,640 miles and an expenditure of $120,000,000."

Other sections of Hargrove's report follow:

"Statistics. — At the close of the year, customers of the gas-utility companies reached a new high of 20,835,000, an increase of 2.7 per cent over 1945. Of this number, 9,401,000 consumers received natural gas, 8,973,000 were served with manufactured gas, and 2,461,000 used mixed gas. In addition, the rapidly expanding liquefied-petroleum-gas industry accounted for an estimated more than 3,000,000 customers in the rural territories beyond the town gas mains.

"Natural-gas revenues were more than $705,000,000, an increase of 3.4 per cent, while revenues from manufactured gas jumped 5.6 per cent over 1945 to approximately $392,000,000. Mixed-gas returns advanced 2.4 per cent to a total of $109,000,000.

"Sales of natural gas, totaling 2,192,778,000,000 cu. ft., were slightly greater than in the previous year, with substantial increases being recorded in residential and commercial gas. Manufactured-gas sales were 412,053,000,000 cu. ft. or 4.2 per cent higher, while mixed-gas sales advanced 3.7 per cent to 145,832,000,000 cu. ft. In both instances, residential and commercial gas registered gains in the neighborhood of 8 per cent as compared with 1945.

Customers Increase 26.6 Per Cent

"While, generally speaking, the gas industry's progress has been widely held to have been steady but unspectacular, a comparison of 1946 figures with those of a decade ago reveals significant if not startling advances. The gas industry, not including L.P.G. branch, has gained 26.6 per cent in total consumers attached to its lines, 77 per cent in sales volume, and 57 per cent in total revenues.

"It is estimated that in the 4 years 1946 to 1949, inclusive, the gas utility industry will add 2,535,000 new customers (not including the L.P.G. industry). It is calculated that during this 4-year period, construction expenditures will be $653,323,000 for physical-plant extension; $278,413,000 for ordinary maintenance expenditures; and $14,430,500 for house piping materials—a grant total of $946,166,500.

"Appliance production.—All factors considered, creditable levels of appliance production were attained at the year's end. Sales of automatic gas water heaters totaled 1,250,000 units—an all-time high level. Expanded production facilities, when unhampered by labor and supply curtailments, will enable this branch of the industry to more than double its 1941 peak production.

"Research and promotion.—The association's research and promotional plan, launched October 1, 1944, has been the main motivating force responsible for the gas industry's rapid progress immediately following the war. Gas-company subscriptions totaling more than $1,600,000 per year, in addition to the regular association budget, are being expended for research, promotion, and advertising.

"A.G.A. laboratories.—The American Gas Association's testing laboratories in Cleveland and Los Angles returned to their first year of full peacetime operations, extending every possible aid to manufacturers in speeding the resumption of production of gas appliances."

Gas, Oil, Automobile Taxes At Record High in 1946

FEDERAL, state and local governments collected an all-time record of $2,300,000,000 in taxes from highway users in 1946, in spite of the fact there were nearly 2,000,000 fewer vehicles in use than in 1941 and new-vehicle production was more than 40 per cent below the 1941 level.

Federal excise taxes, levied as a "temporary revenue measure in 1932, in 1946 netted a total of $732,000,000, an increase of 28 per cent over 1941, according to a study in Automobile Facts, publication of the Automobile Manufacturers Association.

Passenger-car tax revenues, which dropped sharply during the war, have not yet returned to 1941 levels, but truck registrations at a new peak of 5,432,000 resulted in payment of $721,000,000, or nearly a third of all special road-use taxes. During the past year, special taxes on trucks averaged $133 a year each.

The automobile-manufacturers' organization estimated that the average motorist pays $133.74 in special taxes to operate a new automobile its first year, with federal excise taxes on the car, tires and tubes, accounting for 60 per cent of the bill, and state registration fees and taxes on gasoline and oil making up the remainder.

A study of the downward trend in production costs of gasoline and the upward trend in gasoline taxes, prepared by The Texas Co. for publication in the Tax Economics Bulletin of the American Petroleum Institute, emphasizes that while the service-station price of house-brand gasoline has dropped 14 cents a gallon since 1920, taxes have increased 6 cents in a steady upward swing.

The following excerpts from the table illustrate the continuing trend:

AVERAGE COST OF HOUSE-BRAND GASOLINE

(Cents per gallon)

Year	Service station price (excluding tax)	Gasoline tax	Service station price (including tax)
1919	25.41	0.06	25.47
1920	29.74	0.09	29.83
1925	20.09	2.11	22.20
1930	16.16	3.79	19.95
1935	13.55	5.29	18.84
1940	12.75	5.66	18.41
1945	14.22	6.02	20.50
1946	15.52	6.09	21.61

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Among the

Drilling Contractors

Camay Drilling Co., Los Angeles, has received contracts for Union Oil Co. 9 and 10 Folsom and 31 Pinal, Santa Barbara County, California coastal area.

Hinkle Drilling Co. will continue its exploration work at an 8,000-ft. test some 9 miles north of its recent North Port Neches discovery. Location is north and west of the town of Terry in Orange County, Texas, on an 80-acre farmout from Gulf Oil Corp. Work was to get under way immediately.

Workover, Inc. will drill Pan American Production Co. 28 Laws Realty Co. in Section 36-13s-9e, in the Charenton field, St. Mary Parish, Louisiana. It will be a 3,500-ft. sand test.

T. P. Pike Drilling Co., Los Angeles, is drilling at shallow depth on Universal Consolidated Oil Co. 1 Devils Canyon, 25-5n-17w, Devils Canyon area, Los Angeles County, California.

Gibson Drilling Co., Los Angeles, has received contract for Standard Oil Co. of California 2 Deeble Smith, 18-6s-10w, West Newport area, Orange County, California.

Dixie Drilling Co. has contract for Union Oil Co. of California's 10,500-ft. wildcat test in the Houma gas-condensate area in Terrebonne Parish, South Louisiana. It will be the 1 J. C. DuPont, Inc., in 45-16s-17e.

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HOUSTON, TEXAS

Crew of Thompson-Carr, Inc., on location near Odessa, Tex. The men are: A. A. Ferguson, driller; E. W. Arpe, production foreman, Atlantic Oil Co.; T. J. Taft, derrick man; L. M. Brown, motor man; E. J. Denton, backup man, and D. E. Weaver, pipe racker

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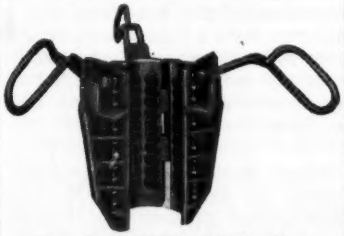

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P. O. Box 4413, Oklahoma City

Galloway & Smith. Wichita Falls, Tex., have made location for a 4,200-ft. wildcat 4½ miles northwest of Woodson, Section 943, TE&L Survey, in Throckmorton County, North Central Texas, for Acme Tool & Die Co. The test will be the 1 N. L. Davis.

Joe Hartmangrueber has contract for John F. Camp & Sons 1 John F. Camp fee, in the extreme southeast corner of Medina County, Southwest Texas, and about 3 miles southeast of the town of Devine. It will be a 2,500-ft. test.

Rowan Drilling Co. was last reported below 10,785 ft. in shale, and going to an undetermined depth, at Phillips Petroleum Co.'s exploration test 7 miles southwest of the Mamou field, Evangeline Parish, South Louisiana. The venture is 1 Vidrine, in 32-3s-1w.

Atlantic Oil Co., Los Angeles contracting firm, is preparing to start drilling on Warren L. Meeker and Russell Garner 1 Mountain View, 18-6s-10w, Huntington Beach district, Orange County, California.

Dunlap & Graham. Long Beach, are preparing to start execution of contract to drill Hiawatha Exploration Co. 4 Atha, 13-6s-11w, Huntington Beach area, Orange County, California.

Texola Drilling Co. has apparently made an important discovery in Hughes County, Oklahoma, with its 1 Meadors, NE NE NW 31-9n-11e. This well flowed at the rate of 100 bbl. of oil an hour on a drill-stem test of the Cromwell sand at 3,090-3,110 ft., total depth. Previously it showed 2,000,000 cu. ft. of gas on a test from 2,674-82 ft. in the Gilcrease. Casing is being run at the present time.

W. G. Ray has been awarded contract by Mid-Continent Petroleum Corp. to drill the 1 J. P. Weaver, 21-14s-19w, wildcat in Ouachita County, Arkansas. This new venture is located 4 miles southeast of the Troy field and is scheduled to go to 3,500 ft.

Big Chief Drilling Co. will drill the 2 R. Lee Parker, 9-6n-2w, Adams County, Mississippi, on contract for Vaughey & Vaughey. This is a La Grange field test, and contractor is building roads into the location at present.

Gabbert & Lindas Drilling Co., Wichita, has taken over the operation of the 1 Bunker Hill, SE SE NE 26-14-13w, Russell County, Kansas, from Leon Wondra, the former operator. At present the hole is bottomed at 2,961 ft. in the Lansing and operators are attempting to squeeze off water so that a core may be taken. A show of oil was reported at 2,960 ft.

FACTS

ABOUT COMPLETING ANY WELL, IF YOU ARE INTERESTED IN ITS FUTURE

The inside of the casing should be scraped!

Burrs from gun-shot holes, hardened cement and mud, paraffine and mill or rust scale, all can be removed from the inside of your casing. Think of the saving of time and money when you can run swabs and packers at any future time without tearing up rubbers; think how you can run tools in and out of the hole without hanging up on any obstructions; think how securely you can pack off against clean, smooth casing. Plan ahead to scrape your casing while the rig is up, and

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PERSONALS

Former Independent Operator Heads Pantepec Oil

C. U. DANIELS, who will become president of Pantepec Oil Co. April 1, entered the oil business 33 years ago at the age of 20 and has had wide experience both as an independent operator and with major companies.

Daniels became general manager of Pantepec in Venezuela in the latter part of October after resigning as vice president in charge of the land and geological department of Oklahoma Natural Gas Co. He will succeed Warren W. Smith, who is retiring after 23 years of service, as president of Pantepec.

Daniels entered the oil business through a job in the run department of Gulf Pipe Line Co. in Tulsa. He spent the following years as a roustabout and tool dresser on cable-tool wells in Oklahoma's Cushing field. He built a casinghead-gasoline plant in 1917 for Panhandle Refining Co. and the following year entered the Army.

Following his release from military service after World War 1 he spent some time in the Texas oil fields and in 1919 constructed a fuel-oil pipe line for J. F. Darby from Burkburnett to Northwest field.

The next 7 years he spent as an independent operator. In 1927 he opened a land and geological office for Sinclair Oil Corp. in Fort Worth, Tex. Two years later he resigned to become an independent operator again. He was appointed vice president of Oklahoma Natural in 1938 and remained with that concern until his recent resignation.

Robert M. Shepardson has been appointed associate manager of Standard Oil Development Co.'s process division. He formerly was an assistant manager.

Joe L. Quinn has been named field representative for Roeser & Pendleton, Inc., with headquarters at Tyler, Tex. He formerly was with Pure Oil Co. and Warren Petroleum Corp.

George S. Cunningham, assistant to **Walter W. Gamble,** manager of mechanical and power operations in the New Jersey Works of Standard Oil Co. of New Jersey, has been named assistant regional engineer and supervisor.

Charles F. Bauer has been named foreman in the electrical department of the Bayonne refinery of Standard Oil Co. of New Jersey. At the Bayway refinery, **Joseph F. Hausleiter** has been promoted to shift foreman in the atmospheric - distillation department.

Jesse L. Poole, Standard-Vacuum Oil Co. employe in its Shanghai, China, office, was recently refused permission, by the Russian military officer-in-charge at Darien, to land there. Poole traveled to Darien on a U. S. Navy ship which was ordered to leave the port after a 48-hour stay.

F. E. Swenson has been named assistant to **Wesley G. Gish,** vice president of Deep Rock Oil Corp. and head of the firm's land and geology departments. In other Deep Rock changes, **L. E. Stegall** will open a land and geological office in Shreveport, La., and **F. E. Melott** will be geologist in charge of the North Texas office, to be established in Wichita Falls.

Hugh E. Dischinger has been appointed superintendent of the east line, products pipe-line department, of Shell Oil Co., Inc., succeeding **John H. Hall,** recently named manager of the engineering department, head office marketing. Dischinger was succeeded as superintendent of the north line by **Hullet P. Ingersoll.**

Merle Becker, of W. C. McBride, Inc., St. Louis, has been named chairman of the legal and legislative committee of the Illinois Oil and Gas Association. Others who will head standing committees until March are: **Basil Moss,** Magnolia Petroleum Co., Mt. Vernon, finance committee; **I. G. Burrell,** Ohio Oil Co., Bridgeport, production, engineering and geology; **Joseph W. Meehan,** Pure Transportation Co., Olney, public relations and publications; **R. T. Savage,** Sohio Petroleum Co., Mt. Vernon, taxation; and **M. M. Laws,** Rock Hill Oil Co., Mt. Vernon, membership.

John R. Crump, geologist, is being transferred from zone offices in Midland, Tex., to district offices in Fort Worth by Gulf Oil Corp.

Willis G. Meyer, partner in the firm of DeGolyer & MacNaughton, has been elected president of the Dallas Geological Society. Other officers are: **John M. Clayton,** Seaboard Oil Co., vice president; **W. W. Newton,** Geotechnical Corp., secretary-treasurer; and **H. C. Vanderpool,** Seaboard Oil, executive committeeman.

Dr. R. G. Atkinson, technical adviser with Shamrock Oil & Gas Corp. in Amarillo, has resigned to join Hydrocarbon Research, Inc., Trenton, N. J., as a process engineer. Atkinson, technical adviser since 1943, formerly was chief chemist at Shamrock's McKee plant and later served as superintendent of manufacturing.

Arthur F. Bridge, vice president and general manager, Southern Counties Gas Co. of California, has been appointed chairman of the managing committee of the American Gas Association testing laboratories by President **R. H. Hargrove.** New committee members include **Elmer F. Schmidt,** vice president and operating manager, Lone Star Gas Co., Dallas.

Wiley Butler, vice president of Coastal Oil Co., Newark, N. J., has been elected president of the company, effective January 2. **Louis E. Marron,** whom Butler succeeds, has become chairman of the board of directors.

Frank E. Lewis, district manager in Texas and New Mexico, is being transferred by Cooperative Refining Association to Wichita, Kans., as division manager. **Jackson M. Barton,** formerly district geologist for Magnolia Petroleum Co., has been named division geologist with the cooperative. Barton is being succeeded by **A. E. Pettit,** who has been on Magnolia's geological staff in Midland, Tex.

K. B. Nowels, independent operator, is retaining his interest and operating supervision of Oklahoma and Texas properties owned by the partnership Hunter, Nowels & Hunter, which has been dissolved. The properties have been acquired by Hill & Hill, Fort Worth.

A. J. Rabe has been appointed manager of sales promotion and sales training for American Oil Co. Rabe is former superintendent of Pan American Pipe Line Co. and during the war was a technologist with the Petroleum Administration for War. He joined American Oil in 1944.

H. C. Dennett will be sales manager for Humble Oil & Refining Co. in the company's new Southwest Texas division offices in San Antonio. Dennett formerly was manager at Corpus Christi.

Hayden Hughes has resigned as assistant to the chief engineer of Phillips Petroleum Co., at Bartlesville, Okla., to join International Petroleum Co. as chief petroleum engineer of the company's Peruvian operations. His headquarters will be in Talara, Peru. A graduate of the University of Oklahoma, Hughes joined Phillips in 1934.

Earl K. Nixon has been appointed oil and gas geologist for the Kansas Geological Survey at the University of Kansas and will join the staff early in January. Nixon has been in Venezuela since 1945 in charge of iron-ore development in the Orinoco River valley for a subsidiary of United States Steel Corp. During the war he was technical consultant to the War Production Board and the Metals Reserve Co.

E. W. Smith has been appointed vice president in charge of sales for Champlin Refining Co. In a move of consolidation, Smith retains his former duties as vice president in charge of station sales, and assumes those of **Leo Snyder,** who has resigned as vice president in charge of refinery sales.

Jack B. Ryan is new geological scout for Stanolind Oil & Gas Co. at Wichita Falls, Tex. He was previously with W. A. Delaney, Jr., at Ada, Okla. Stanolind transfers included **Darner C. Clark,** district geologist, from Amarillo to Tyler, Tex., replacing **G. P. Buskirk,** who will move to the Gulf Coast area. **Robert W. Mallory,** Casper, Wyo., replaces Clark at Amarillo.

Laurence B. Levi, director of Socony-Vacuum Oil Co., Inc., and chairman of its foreign-trade committee, has retired, effective December 31. Levi, who joined Standard Oil Co. as an office boy 48 years ago, later became chairman of Vacuum's export department and in 1931 was elected a director of the company.

J. W. COWLES

James W. Cowles, former manager of the gas-gasoline division of Shell Oil Co., Inc., has retired, effective January 1, following 21 years of service with Shell. At the time of his retirement he was serving as special assistant to **V. E. Middlebrook,** manager of the gas-gasoline department. Cowles began his oil and gas career in 1917 in a job of approving casinghead-gas contracts on lands of restricted Indians in the Five Civilized Tribes. He joined Skelly Oil Co. in 1922 and in 1926 accepted a position with Roxana Petroleum Corp., which later was merged with Shell Oil Co., Inc. He received the Hanlon award for meritorious service to the natural-gasoline industry in 1938.

George J. Helis is the new manager of Texas and New Mexico operations of American Trading & Production Corp., with offices in Midland, Tex.

D. B. Hodges has been named vice president, Shell Oil Co., Inc., in charge of transportation and supplies. He has been with Shell more than 20 years.

D. W. Woods, recently named general counsel of General Petroleum Corp., has been elected to the company's board of directors. Woods was succeeded as secretary of the corporation by **J. M. Jessen,** assistant secretary.

Joseph D. Peeler, Los Angeles, has been elected a director of Tide Water Associated Oil Co.

Charles R. Bell, head of the accounting department of Kerr-McGee Oil Industries, Inc., has resigned to open an office in Corpus Christi, Tex.

H. H. McCall, independent operator, has been named a state conservation agent for the Kansas Corporation Commission by **T. A. Morgan,** state conservation director.

Lee Cornelius, formerly with the land department of Gulf Oil Corp. at Midland, Tex., is now assistant head of the land, leasing and scouting department for Gulf at Fort Worth.

Joe J. Uri has resigned as assistant district geologist for British American Oil Producing Co. at Shreveport to join the staff of Texas Pacific Coal & Oil Co. at Jackson, Miss.

PENBERTHY

"ALL IRON"

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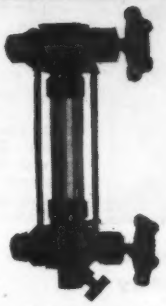

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Equipment Men in the News

Kluppel Joins Turney Manufacturing

Turney Manufacturing Co., Inc., Houston, announces the appointment of C. B. Kluppel as chief engineer in charge of engineering on power-drilling rigs. For the past 3 years Kluppel has served as consulting engineer in the oilfield division of Clark Brothers, Olean, N. Y.

Cooper Releases Pipe-Line Directory

Annual personnel directory devoted to the pipe-line industry of the United States and Canada has been released by Midwest Oil Register, Tulsa. C. L. Cooper, formerly in the circulation department of The Oil and Gas Journal, recently purchased the Register.

Formica Sends Hess to Assist DeLaRue British Licensee

William O. Hess, project engineer in the engineering department of Formica Insulation Co., Cincinnati, has gone to England to give counsel to engineers and management of DeLaRue Insulation, Ltd., British licensees for production and marketing of Formica products.

Bjorksten Forms Corporation

Dr. Johan Bjorksten, owner of Bjorksten Laboratories, is forming a corporation under the name of Bjorksten Research Laboratories. This corporation will continue and expand the business of Bjorksten Laboratories. Officers are: Dr. Johan Bjorksten, president and treasurer; Stuart O. Fiedler, vice president, and A. Charles Lawrence, secretary.

Jarvis Moves to Illinois Basin

Harold Jarvis, sales engineer of Tulsa, will move into the Illinois basin early in January to represent Hale Supply Co. and Richmond Chemical Co., both of Tulsa, and Dragon Manufacturing Co., Marietta, Ohio. Jarvis' tentative plans are to locate in Mount Vernon from which point he will cover Illinois, Indiana, Michigan, and western Kentucky.

Frohman Appointed Sales Engineer

R. J. Thompson, general sales manager of Ampco Metal, Inc., Milwaukee, announces appointment of Oscar Frohman as general sales engineer. Previously Frohman was manager of market development and will continue to carry out such work as is necessary in that capacity. James Arter, who was general sales engineer, has been assigned duties of assistant to general manager.

Tracy Elected Vice President

Fred F. Murray, president of Oil Well Supply Co., U. S. Steel subsidiary, has announced election of Lloyd E. Tracy as vice president of the company. Tracy retains the position of general manager of sales.

Thermoid Expands West

Fred Schulter, president of Thermoid Co., Trenton, N. J., announces expansion of the company's operations with the construction of a new manufacturing plant at Nephi, Utah. To be known as Thermoid Western Co., the Nephi plant has been undertaken to supply the West Coast and northwestern business. The plant expects to begin operations by the summer of 1947.

Voran Advertising Manager For Parker Appliance

Appointment of S. E. "Tony" Voran as advertising manager of Parker Appliance Co., Cleveland, is announced by D. W. Holmes, general sales manager.

Graver Tank Purchases Banks Moreland

Banks Moreland Co. was purchased October 1, 1946, by Graver Tank & Manufacturing Co., Inc., and will continue to operate in the Southwest as Banks Moreland Co., a division of Graver. The new division will be under the management of Banks Moreland, who has been made a vice president of Graver Tank.

Smith Enlarges Facilities

The Nowery J. Smith Co., which recently sold its steel fabricating division to Parkersburg Rig & Reel Co., has enlarged its hot-dip galvanizing facilities which the company retained. The company will engineer additional corrosive protection methods in coatings, chrome and plastic, and will warehouse various galvanized and specially coated steel products for both the oil industry and industrial trade.

Hope President of Stanco

STANLEY C. HOPE

Stanley C. Hope, president of Gilbert & Barker Manufacturing Co., Springfield, Mass., has been elected president of Stanco, Inc., Linden, N. J. These companies are affiliates of Standard Oil Co. (N. J.). Hope will hold the presidencies of both companies. He succeeds F. W. Moss, who will remain as a foreign marketing adviser before retiring.

Grace Elected Pennsalt Director

Charles B. Grace, vice president and treasurer of Heintz Manufacturing Co., Philadelphia, was elected a member of the board of directors of Pennsylvania Salt Manufacturing Co. in a recent meeting of the board. Grace also is a director of Girard Trust Co., Philadelphia.

National Supply Opens New Store

With the opening this month of National Supply Co.'s store in Rock Springs, Wyo., the company now has 99 stores in the oil fields of this country and Canada, according to A. W. McKinney, vice president and general manager of sales. C. W. Morris, who has been manager of the Casper, Wyo., store, is manager of the company's newest outlet.

Alliger With Geophoto Services

Jerald Alliger, recently with the U. S. Geological Survey in Denver, is now associated with Geophoto Services, Inc., as a photogeologist.

Goodrich Revises Territorial Organization

Revision of the territorial organization of replacement tire sales division of B. F. Goodrich Co. into five divisions instead of four, and appointments of five sales executives in connection with the changes are announced by Guy Gundaker, Jr., field sales manager. L. T. "Tom" Greiner is named manager of the southwestern division, comprising the Dallas, Houston, Kansas City, Oklahoma City, and St. Louis districts, all formerly in the central division. Headquarters will be in Oklahoma City. A. C. "Al" Kelly is the new manager of central division, succeeding McGill. His territory will now comprise the Chicago, Indianapolis, and Minneapolis districts, which were in the central division, Cincinnati, formerly in the southern division, and Cleveland and Detroit, previously in the eastern division. Headquarters will be in Chicago. Hugh Reichert, manager of the Buffalo district since 1943, succeeds Kelly at Chicago and George R. Empson is new manager of the Buffalo district. Hoyt Price has been named manager of the Oklahoma City district, succeeding Greiner.

P. V. GALVIN

Galvin Appoints Scott

P. V. Galvin, president and founder of Galvin Manufacturing Corp., Chicago, announces appointment of Walter B. Scott, Chicago, to position of assistant to P. K. Povisen, who is assistant to the president.

Mallon Assistant Commercial Manager of Chevrolet

Announcement of the appointment of T. C. Mallon as assistant manager, commercial and truck department, Chevrolet Motor Division, General Motors Corp., is made by C. W. Burke, manager of the department.

Inspection Firm in Saudi Arabia

Chas. Martin & Co., inspectors of petroleum, approved and licensed by New York Products Exchange, has established inspection service at Ras Tanura, Saudi Arabia. Frank P. Keller, who has been with the company the past 10 years in Bayway, N. J., will be in charge of operations in Ras Tanura.

Oil Base, Inc., Appoints Export Representative

GEORGE MILLER

George Miller, president of Oil Base, Inc., Los Angeles, has announced the appointment of Transamerican Factors, Ltd., as exclusive export representative for South America, Mexico, and the West Indies. Transamerican Factors, Ltd., with headquarters in Los Angeles, headed by Victor E. Milch, has long been engaged in the export of oil-field equipment to Latin America. Dr. Gonzalo Acosta Sarmiento is the resident partner of the firm in charge of the regional office in Bogota, Colombia, servicing the west coast countries of Colombia, Ecuador, and Peru. Dr. Hermando Madero Paris heads the company's activities in Venezuela and the West Indies.